



Version 4.1

USER GUIDE

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Research Triangle Park, NC 27711**

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CONTENTS

	Page
CHAPTER I. WELCOME TO AirControlNET	1
A. WHO IS THIS TOOL FOR?	2
B. HOW THE MANUAL IS ORGANIZED	2
C. SYSTEM REQUIREMENTS	3
D. INSTALLING/UNINSTALLING AirControlNET	4
1. Installing AirControlNET	4
2. Uninstalling AirControlNET	4
E. WHOM TO CONTACT WITH COMMENTS/QUESTIONS	4
F. SOURCES FOR MORE INFORMATION	5
CHAPTER II. OVERVIEW OF AirControlNET	7
A. GETTING STARTED	7
1. Data Set Tool	9
2. Sensitivity Control Set Tool	9
3. Mobile Measures Tool	19
4. Selecting Year for Reporting Costs	27
5. Use of Help from the AirControlNET Toolbar Menu	27
B. SUMMARY OF AirControlNET MODULES	27
CHAPTER III. CONTROL SCENARIOS MODULE	31
A. OVERVIEW OF CONTROL SCENARIOS MODULE INTERFACE	31
1. Filtering Criteria Fields	33
2. User Commands	35
3. Control Summary Fields	36
B. CREATING A CONTROL SCENARIO	36
1. Maximum Control Scenario	44
2. Operating and Maintenance (O&M) Cost Values	44
3. On-the-fly Sensitivity Calculation	44
C. SAVING A CONTROL SCENARIO	48
D. EXPORTING AND REPORTING	48
1. Exporting Data from a Control Scenario	48
2. Reporting Data from a Control Scenario	52
CHAPTER IV. LEAST-COST MODULE	55
A. OVERVIEW OF LEAST-COST MODULE INTERFACE	57
1. Filtering Criteria Fields	58
2. User Commands	59
3. Control Summary Fields	60
B. DEVELOPING A LEAST-COST CONTROL SCENARIO	60
C. EXPORTING AND REPORTING	64

1.	Exporting Data from a Least-Cost Control Scenario	64
2.	Reporting Data from a Least-Cost Control Scenario	67
CHAPTER V.	SCRIPT BUILDER MODULE	71
A.	OVERVIEW OF SCRIPT BUILDER MODULE INTERFACE	71
1.	Filtering Criteria Fields	73
2.	User Commands	74
B.	DEVELOPING A REMSAD-ST SCRIPT	75
CHAPTER VI.	ANALYSIS TOOLS	85
A.	MAP ANALYSIS TOOL	85
1.	Overview of the AirControlNET Mapping Tool	85
2.	Creating a Map	89
B.	GRAPH ANALYSIS TOOL	90
1.	Overview of Graphing Tool	94
2.	Example of Graph Analysis Tool	94
APPENDIX A:	DATABASE GRID VARIABLES FOR CONTROL SCENARIOS	
MODULE		A-1
APPENDIX B:	DATABASE GRID VARIABLES FOR LEAST-COST MODULE	B-1
APPENDIX C:	DATABASE GRID VARIABLES FOR SCRIPT BUILDER MODULE	C-1
APPENDIX D:	REPORTING FILES FOR CONTROL SCENARIOS MODULE	D-1

TABLES AND FIGURES

	Page	
Table I-1	Summary Table of Control Measures by Sector and Pollutant	1
Table II-1	MOBILE6 Vehicle Classifications	25
Table IV-1	1999 Nationwide Emissions by Pollutant and Sector	55
Figure II-1	AirControlNET Welcome Screen	8
Figure II-2	Selection of Data Set Tool under Data Menu	10
Figure II-3	Selection of the Emission Inventory Baseline	10
Figure II-4	Load Data Set Window	11
Figure II-5	Browse Data Set Window	12
Figure II-6	Delete Confirmation Window	13
Figure II-7	Permanent Delete Option Window	13
Figure II-8	Control Set Tool Interface	13
Figure II-9	New Sensitivity Control Set Interface	15
Figure II-10	Add and Remove measures from Modified Controls Grid Window	16
Figure II-11	QA Messages Display Window	17

Figure II-12	Load Control Set Window	17
Figure II-13	Calculate Data Set Window	18
Figure II-14	New Mobile Source Controls Grid Window	21
Figure II-15	New Mobile Measure Data Input Window	22
Figure II-16	New Mobile Measure Data Window - Modifying Pollutant Reduction	23
Figure II-17	New Mobile Measure Data Window - Modifying VMT Reduction	24
Figure II-18	Selection of Control Cost Year Window	28
Figure II-19	Selection of AirControlNET Help Toolbar Window	28
Figure III-1	Control Scenarios Module Interface	32
Figure III-2	Possible Combinations of Criteria Fields	34
Figure III-3	Control Scenario Filter Selection	38
Figure III-4	Control Scenario Database Grid After Running Query	39
Figure III-5	Database Grid and Summary Fields with Selected NO _x Controls	40
Figure III-6	Database Grid and Summary Fields with Selected NO _x and SO ₂ Controls	42
Figure III-7	Database Grid After View Selected Command	43
Figure III-8	Maximum Control Scenario	45
Figure III-9	O&M Cost Component Values For Control Measures	46
Figure III-10	On-the-fly Sensitivity Calculation for Control Measures	47
Figure III-11	Control Scenario File Save As Dialog Box	49
Figure III-12	Measure File Save As Dialog Box	50
Figure III-13	REMSAD-ST Script Save As Dialog Box	51
Figure III-14	Control Cost File Save As Dialog Box	53
Figure IV-1	Least-Cost Module Interface	56
Figure IV-2	Possible Combinations of Filtering Criteria Fields: Least-Cost Module	59
Figure IV-3	Least-Cost Scenario Resulting From an Absolute Ton Reduction Target: Show Criteria	62
Figure IV-4	Least-Cost Scenario Resulting From a Percentage Reduction Target: Show Criteria	63
Figure IV-5	Least-Cost Scenario Resulting From an Absolute Ton Reduction Target	65
Figure IV-6	Least-Cost Scenario Resulting From a Percentage Reduction Target	66
Figure IV-7	REMSAD-ST Script Save As Dialog Box	68
Figure IV-8	Control Cost File Save As Dialog Box	69
Figure V-1	Script Builder Module Interface	72
Figure V-2	Possible Combinations of Filtering Criteria Fields: Script Builder Module	74
Figure V-3	Selection of Filtering Criteria within Script Builder Module	76
Figure V-4	Entering Pollutant Control Factors	77
Figure V-5	Addition of Individual Scenario to Display Grid	79
Figure V-6	Specification of Additional Control Scenario: Applying Filtering Criteria and Entering Pollutant Control Factors	80
Figure V-7	REMSAD-ST Script Save as Dialog Box	82
Figure V-8	Example REMSAD-ST Script	83
Figure VI-1	Selection Of Mapping Tool under Analysis Tab	86
Figure VI-2	Map Creation Window.	87
Figure VI-3	Map Display Window	88

Figure VI-4 Selection Of Graphing Tool under Analysis Tab [91](#)
Figure VI-5 Graph of Cost per Ton vs Incremental Tons Reduced [92](#)
Figure VI-6 Graph of Cost vs Incremental Tons Reduced. [93](#)

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CHAPTER I. WELCOME TO AirControlNET

AirControlNET is a control strategy and costing analysis tool developed by E.H. Pechan & Associates for the U.S. Environmental Protection Agency (EPA) to assist them in conducting regulatory impact analyses of air pollution regulations and policies. AirControlNET is a relational database system in which control technologies are linked to sources within EPA emissions inventories. It contains a database of control measures and cost information for reducing the emissions of criteria pollutants (e.g., NO_x, SO₂, VOC, PM₁₀, PM_{2.5}, NH₃) as well as CO and Hg from point (utility and non-utility), area, nonroad, and mobile sources as provided in EPA's National Emission Inventory (NEI) format. As such, AirControlNET is linked to and dependent upon EPA emission inventories as a source of emissions data. The control measure data files in AirControlNET include the control efficiency to calculate emission reductions for that source and cost data (annual and capital) to calculate the total costs of applying the control measure.

Table I-1 provides the number of control measures within AirControlNET for each sector and pollutant.

Table I-1. Summary Table of Control Measures by Sector and Pollutant

Major Pollutant	Utility	Non-Utility	Area	Onroad	Nonroad	Total
NH ₃	0	0	3	0	0	3
NO _x	26	417	15	15	8	481
PM	24	165	12	13	0	214
SO ₂	6	37	0	0	0	43
VOC	0	7	65	5	12	89
Hg	5	0	0	0	0	5

As shown above, AirControlNET contains an extensive accounting for pollutant control measures available across sources.

The functions within AirControlNET include:

- 1) Control Scenarios Module (CSM) that allows you to select specific control measures from the database by pollutant, source, and geographic area to create an emissions reduction scenario with computed emissions reductions and associated costs. You can then export this scenario into spreadsheet format for further analysis or into an input script for air quality modeling within REMSAD-ST (Pechan and ENVIRON, 2001 and 2002).
- 2) Least-Cost Module (LCM) that allows you to obtain an emissions reduction scenario by source and geographic area consisting of the set of control measures that achieves a stated pollutant-specific emission reduction target (in tons or percentage) with the least amount of total annual costs.

- 3) Script Builder Module (SBM) that allows you to develop “control factor files” based on percent reductions by pollutant, source, and geographic area to create an emissions reduction scenario for input into the REMSAD-ST air quality model.

AirControlNET also includes exporting and reporting features that allow you to export emissions and cost data resulting from your queries into text files, maps, charts, spreadsheets, or pre-formatted reporting tables.

This document describes the use of AirControlNET through its interface, which facilitates the viewing, analysis, and exporting of the information contained within the database. Documentation of the control measure files and the development of the AirControlNET database are provided in companion volumes (Pechan, 2005a and Pechan, 2005b).

A. WHO IS THIS TOOL FOR?

AirControlNET can be used by a wide range of people including policy analysts, engineers, economists, and others interested in evaluating the effectiveness and costs of air pollution control strategies. This tool allows you to search and review available control measures and to obtain information regarding pollutant emission reductions and associated costs for use in regulatory and policy evaluations or modeling efforts. It also allows you to export these data for use in further analysis and for input to the REMSAD-ST air quality modeling tool. It therefore reduces the time and effort typically associated with obtaining such information and makes available the information used by EPA/OAQPS for its regulatory analyses. Furthermore, it provides the opportunity for you to share your knowledge and expertise by reviewing the data contained within AirControlNET and providing new or updated information.

B. HOW THE MANUAL IS ORGANIZED

The manual includes the following chapters and appendices:

Chapter I: Welcome to AirControlNET – This chapter includes a brief summary of the AirControlNET application, necessary system requirements, installation instructions and sources of further information concerning control application and costing.

Chapter II: Overview of AirControlNET – This chapter provides basic instructions for running the AirControlNET application, including inventory and cost year selection, an overview of the modules and the help function associated with the application.

Chapter III: Control Scenarios Module – This chapter details the operation of the Control Scenarios Module including an overview of the interface, detailed descriptions of the filtering and query options, the creation of a control scenario and an explanation of the “Max Control” option. This chapter also

provides information on saving, exporting and reporting options including the export of measure files, REMSAD-ST Script Files, and cost files.

Chapter IV: Least-Cost Module – This chapter details the operation of the Least-Cost Module including an overview of the interface, detailed descriptions of the filtering and query options, and the creation of a least-cost control scenario. This chapter also provides information on saving, exporting and reporting options including the export of measure files, REMSAD-ST Script Files, and cost files.

Chapter V: Script Builder Module – This chapter details the operation of the REMSAD-ST Script Builder Module including an overview of the interface, detailed descriptions of the filtering and query options, and the creation of a “control factors file” or script file. This chapter also provides information on saving and exporting REMSAD-ST Script Files.

Chapter VI: Analysis Tools – This chapter details two analysis tools available within AirControlNET 4.1. It provides overview of the tools and step-by-step tutorial to produce maps and graphs using these tools.

Appendix A: Database Grid Variables for Control Scenarios Module

Appendix B: Database Grid Variables for Least-Cost Module

Appendix C: Database Grid Variables for Script Builder Module

Appendix D: Reporting Files for Control Scenarios Module

Specific control measure information, including costing methods and control effectiveness calculations is detailed in AirControlNET Volume III: Control Measure Documentation for AirControlNET (Pechan, 2005b). Information concerning the development and history of AirControlNET can be found in the AirControlNET Volume II: Development Report (Pechan, 2005a).

C. SYSTEM REQUIREMENTS

Based on our testing and evaluation, the minimum system requirements for installation and proper operation of AirControlNET include the following:

Operating System

Windows 98, 2000 or Windows XP

CPU

Speed = 233 MHz

RAM

RAM = 64 MB

Storage

Hard Drive Free Space = 650 MB

Display

Mode VGA

Colors = 256

Resolution = 800 x 600

Other Hardware

CD-ROM Drive

D. INSTALLING/UNINSTALLING AirControlNET**1. Installing AirControlNET**

AirControlNET is distributed on CD-ROM, so to install AirControlNET, please follow the directions provided by the InstallShield Wizard that automatically appear upon inserting the CD into your CD-ROM drive. If the InstallShield Wizard does not automatically appear, then simply run the setup.exe file that can be found in the base directory of your CD-ROM drive. Once the installation tasks are completed, the InstallShield Wizard's "Completed Dialog Box" will appear. Click "Finish" so that you can then proceed with your application of AirControlNET. This process should take no more than 10 minutes depending upon your computer system.

2. Uninstalling AirControlNET

There are two methods for you to appropriately uninstall AirControlNET:

- 1) From the Windows Start Menu, click the "Uninstall AirControlNET" shortcut that was created during installation.
- 2) From the Control Panel Add or Remove Programs dialog box, select AirControlNET and click "Remove".

*Please note that after uninstalling AirControlNET some files may remain on your system. These include all shortcuts that were moved to a new location after the original installation as well as files that you created in your AirControlNET directory (C:\program files\AirControlNET). It is not necessary to delete these files.

E. WHOM TO CONTACT WITH COMMENTS/QUESTIONS

For comments and questions, please contact Larry Sorrels at the Environmental Protection Agency's Office of Air Quality Planning and Standards.

Address: EPA/OAQPS C339-01, Research Triangle Park, NC 27711
E-mail: sorrels.larry@epa.gov
Telephone: (919) 541-5041

F. SOURCES FOR MORE INFORMATION

For sources of more information on conducting control strategy and costing analysis, see the following:

EPA Air Pollution Control Cost Manual (Downloadable as a PDF from http://www.epa.gov/ttn/catc/dir1/cost_toc.pdf).

Background Information Documents can be downloaded from the Air Toxics Website (<http://www.epa.gov/ttn/atw>).

Clean Air Technology Center (CATC) provides fact sheets concerning various pollution control technologies that can be downloaded as compressed Word Perfect documents (WPD) and PDF files from their website at: <http://www.epa.gov/ttn/catc/products.html#aptecfacts>.

The Clearing House for Inventories and Emission Factors (CHIEF) website (<http://www.epa.gov/ttn/chief/>) provides access to emission inventories, emission factors and modeling tools. Supporting documentation for the emission inventories can also be found on this website.

Control measure datasets for additional years and scenarios developed from various EPA emissions inventories can be found at www.emissionsonline.org/AirControlNET/. These can be downloaded and used in AirControlNET.

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CHAPTER II. OVERVIEW OF AirControlNET

AirControlNET is a control strategy and costing analysis tool that allows you to perform data queries from a large database of emission control measures. As developed, this tool facilitates such searches through its interface. Within each AirControlNET module, the selection process is quite simple and allows you to define the measures of interest by specifying a custom set of criteria. Once you have defined a control strategy then the resulting data can be exported into a text or spreadsheet file for further analysis or reporting. This section provides an overview of AirControlNET with an introduction to the Main Interface or "Welcome Screen" and describes how to get started. It also includes a summary of the AirControlNET modules. Information on using each of these modules is provided in the remaining chapters of this user manual.

A. GETTING STARTED

There are three ways for you to open AirControlNET and begin an application:

- 1) Simply double-click the desktop shortcut that was created during installation;
- 2) From the Windows Start Menu, click the AirControlNET shortcut that was created during installation; or



- 3) Run the "cn.exe" application file from the installation directory. (The default installation directory is C:\Program Files\E.H. Pechan\AirControlNET 4.1\).

Please note that it is deemed best to use AirControlNET without other active programs to reduce or minimize the likelihood of program delays and instability.

Upon opening AirControlNET, you will then be presented with the Main Interface or "Welcome Screen" as shown in Figure II-1. The main interface provides the starting point from which to begin a data query through one of the three available modules. However, before proceeding with one of the AirControlNET modules, you should specify the control measure data set from which the emission reductions will be generated as well as the year for reporting the associated costs of implementing the selected control measures.

Figure II-1. AirControlNET Welcome Screen



1. Data Set Tool

AirControlNET allows you the flexibility of selecting the baseline and user modified emissions data for emission reduction and cost evaluation of control strategies. The Data Set Tool allows the user to Add, Remove, Edit descriptions, and Select existing AirControlNET data sets. Once the desired data set has been loaded into AirControlNET, it will be used in the Control Scenario Module, Least Cost Module, and Reporting Module. Selecting "Data Set Tool" from the main "Data" menu (see Figure II-2) will launch the Data Set Tool interface shown in Figure II-3.

Selecting a default data set allows you to query that data set in any of the AirControlNET modules (Control Scenarios Module, Least Cost, Module, etc.). Clicking on any of the previously loaded inventories and clicking the "Select" button sets the default data set. Note that the default data set is denoted with an asterisk (*).

To add an inventory to the data set list, click the "Load" button. The interface that is displayed, as shown in see Figure II-4, allows you to browse for a data set and type in its description. The browse window is shown in Figure II-5. The data set name and path are automatically set when browsing for the inventory. To edit the description of a previously loaded data set, click the "Edit" button.

Data sets can be removed from AirControlNET by selecting an inventory and clicking the "Delete" button. You will receive the confirmation message as shown in Figure II-6 which asked you to confirm that you want to remove the data set. If you choose to remove the data set, you will then be asked if you wish to permanently delete the inventory from your computer. This window is shown in Figure II-7. Regardless of your choice, the data set will be removed from AirControlNET.

The Data Set Tool can merge any two data sets using the "Combine" button shown in Figure II-3. Once a data set is selected, the "Combine" button becomes available and when it is clicked, the user is prompted to enter the resulting data set's information. Next, the user is presented with a screen that displays the base data set (the one that is selected before the "Combine" button is clicked), the additional data set, and the resulting data set. Before proceeding with the merge, the user must select the additional data set to combine with the base. Duplicates keys are handled by giving the base data set priority. If a base data set key exists in the additional data set, the latter key, and its data, is ignored.

2. Sensitivity Control Set Tool

The Sensitivity Control Set Tool is used to create and maintain sensitivity control sets that contain the parameters that allow for modified AirControlNET control measures. The parameters that can be modified are control measure efficiency, interest rates, labor rates, energy costs, and equipment lifetimes. Sensitivity Control Sets are used in conjunction with base data sets to create modified data sets and the currently selected control set is used to execute "on the fly" sensitivity calculations in the Control Scenario Module. The Control Set Tool interface, shown in Figure II-8, prefixes the default control set with asterisk (*). Once a control set has

Figure II-2. Selection of Data Set Tool under Data Menu



Figure II-3. Selection of the Emission Inventory Baseline

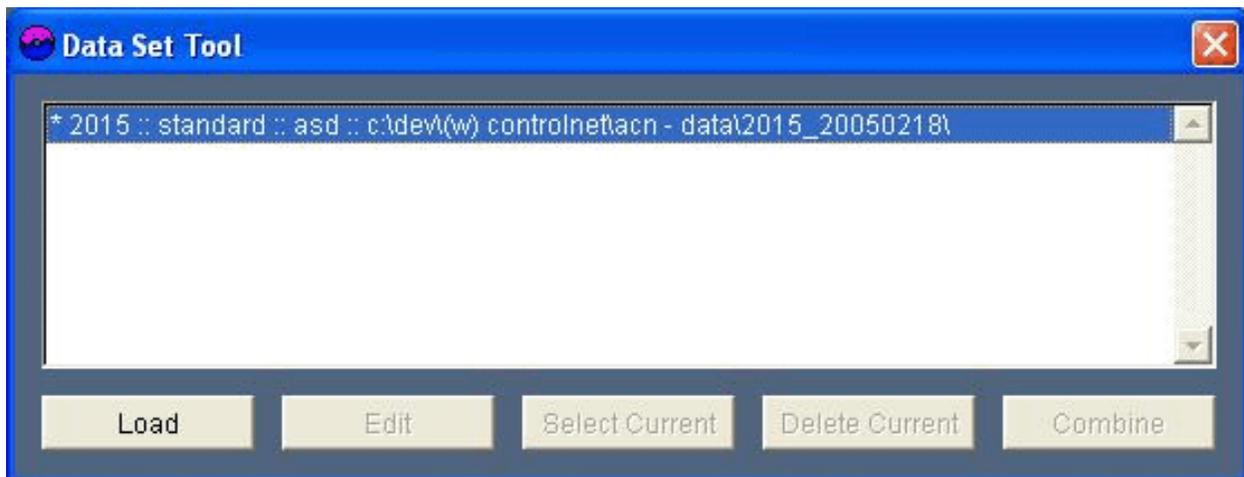


Figure II-4. Load Data Set Window



Figure II-5. Browse Data Set Window

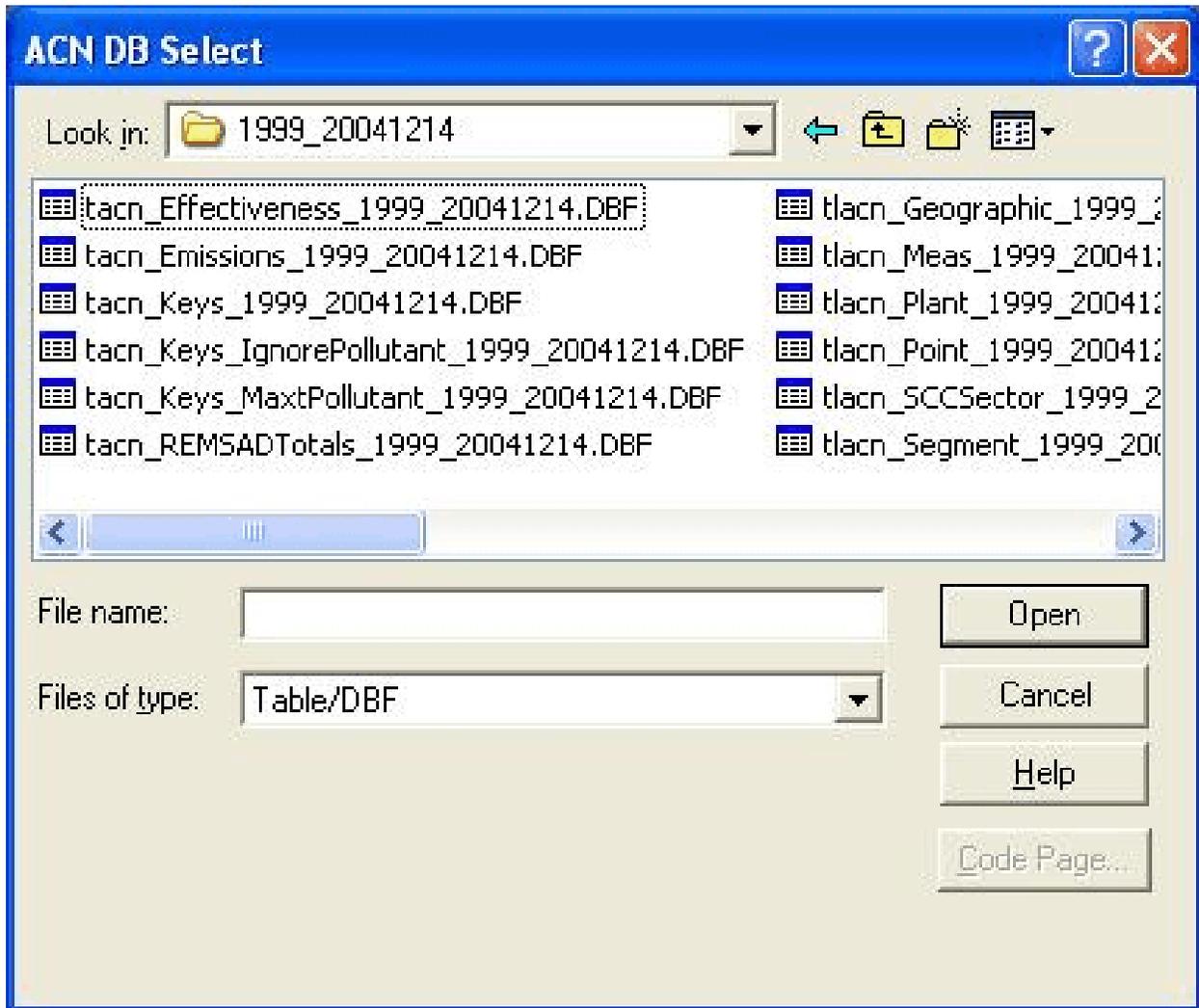
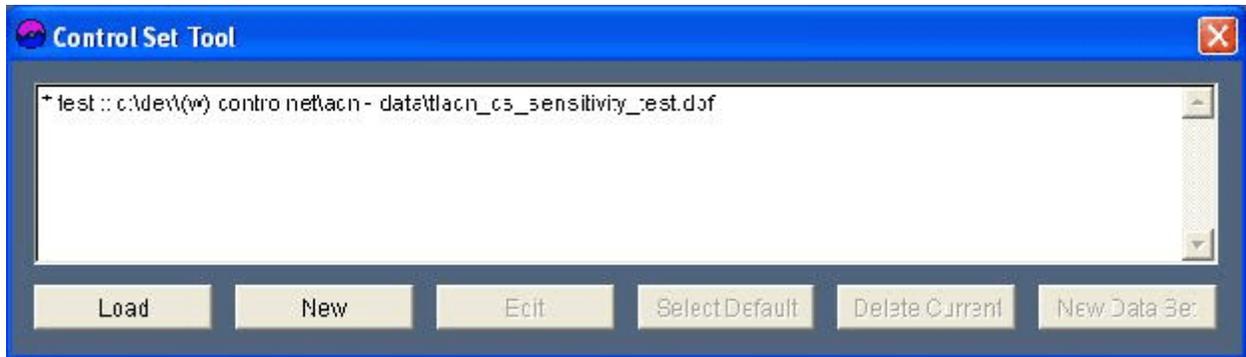


Figure II-6. Delete Confirmation Window



been selected, the “Sensitivity” checkbox on the Control Scenarios Module interface becomes enabled (see Chapter 3: Control Scenarios Module).

When the “New” button is clicked, an interface is displayed that allows the user to modify existing AirControlNET measures (see Figure II-9). The first step in creating a new control set is to add existing controls to the modified controls grid. This is done by clicking measures in the existing controls grid (the upper grid) and clicking the “Add” button - clicking a measure in the lower grid and clicking the “Remove” button deletes it (see Figure II-10). Once controls have been added to the modified controls grid, you may change the measures’ values (grayed out cells are read-only). You can check to see if your modified values are acceptable by clicking the QA button. If your value is outside the recommend range, the value will be colored yellow and marked as a warning. If your value is outside the valid range, the value will be colored red and marked as an error. All warnings and errors are explained in the “QA Message” column of the grid (Figure II-11). You may save a control set that has no errors by clicking the “Save” button. Once you are done, close the window and set a description for the control set. If you wish to edit the description of a control set or change its modified measures, select the control set and click the “Edit” button. To load an existing control set that is not currently displayed, click the “Load” button. Then, browse for the control set and set its description (see Figure II-12). To remove, a control set, click the “Delete” button. You will receive a confirmation message and be asked if you want to permanently delete the control set.

The Sensitivity Control Set Tool also allows you to create new data sets based on your modified controls. Select the desired control set and click the “New Data Set” button. You will be prompted with the new data set information - browse for the new data set’s path and set name and description. The new data set interface (Figure II-13) displays the selected control set, the new data set information, and prompts you to select the base data set. Clicking “Calculate” will calculate the new data set and add it to the Data Set Tool. Calculating a new data set takes a significant amount of time.

Creating a new sensitivity control measures set using “Sensitivity Control Set Tool”:

This section guides you through the creation of a new sensitivity control set. A sensitivity control set is created by modifying existing parameter values of selected control measures. Example used for the tutorial is to create sensitivity data set of all the ammonia controls; NGR & SCR controls on Utility Boiler – Coal/Wall; and NGR control on Utility Boiler – Coal/Tangential.

Step 1 Select “Sensitivity Control Set Tool” under Data tab from the main menu

On selection of “Sensitivity Control Set Tool”, you will be presented with “Control Set Tool” interface. The “Control Set Tool” interface, shown in Figure II-8, prefixes the default control set with asterisk (*). You can load any previously created control set, edit any loaded control set, create new control set, unload/delete control set from AirControlNET, select default control set and create new sensitivity data set in conjunction with base data set through this interface. Upon selection of any default control set, “Sensitivity” checkbox on Control Scenarios Module interface becomes enabled. For our example, select “New” command to create new control set.

Figure II-9. New Sensitivity Control Set Interface

Existing Controls

Measure Code	Measure	Source	Pollutant	Interest Rate	Control Eff
BLU101	Chemical Additives	Cattle Feedlots	PH3	0.0000	50.000
AR0201	Chemical Additives	Poultry Operations	PH3	0.0000	75.000
AC0301	Chemical Additives	Hog Operations	PH3	0.0000	50.000
NDC1C1	SNCR	Utility Emitter - Coal/Wall	NOX	7.0000	20.000
NDC1C2	NCR	Utility Emitter - Coal/Wall	NOX	6.5500	50.000
NDC1C3	SCR	Utility Emitter - Coal/Wall	NOX	7.0000	50.000
NDC2C1	SNCR	Utility Emitter - Coal/Tangent st	NOX	7.0000	35.000
MUL2C2	NGR	Utility Emitter - Coal/Tangent st	NOX	6.5500	50.000

Modified Controls

Measure Code	Measure	Source	Pollutant	Interest Rate	Control Eff

Buttons: Add, Remove, OK, Save, Close

Figure II-10. Add and Remove measures from Modified Controls Grid Window

ACN - New Sensitivity Control Set

Existing Controls					
Measure Code	Measure	Source	Pollutant	Interest Rate	Control Eff
ALL1C1	Chemical Additives	Cattle Feedlots	NH3	3.0000	50.000
ALL2C1	Chemical Additives	Poultry Operations	NH3	3.0000	75.000
ACC3C1	Chemical Additives	Truck Operations	NH3	3.0000	50.000
ND0101	SNCR	Utility Boiler - Coal//Wal	NOX	7.0000	35.000
ND0102	NCR	Utility Boiler - Coal//Wal	NOX	3.5500	50.000
ND0103	SCR	Utility Boiler - Coal//Wal	NOX	7.0000	80.000
ND0201	SNCR	Utility Boiler - Coal/Tangema	NOX	7.0000	35.000
ND0202	NGR	Utility Boiler - Coal/Tangema	NOX	3.5500	50.000

Modified Controls					
Measure Code	Measure	Source	Pollutant	Interest Rate	Control Eff
ACC1C1	Chemical Additives	Cattle Feedlots	NH3	3.000	50.000
ALL3C1	Chemical Additives	Truck Operations	NH3	3.000	50.000
ALL2C1	Chemical Additives	Poultry Operations	NH3	3.000	75.000
ND0102	NGR	Utility Boiler - Coal//Wal	NOX	3.550	50.000
ND0103	SCR	Utility Boiler - Coal//Wal	NOX	7.000	80.000
ND0202	NGR	Utility Boiler - Coal/Tangema	NOX	3.550	50.000

Figure II-11. QA Messages Display Window

Existing Controls

Measure Code	Measure	Source	Plant Interest Rate	Control Eff
A00101	Chemical Additives	Cellulose	NPS	3.0000
A00201	Chemical Additives	Facility Operators	NPS	3.0000
A00301	Chemical Additives	Hog Operations	NPS	3.0000
N00101	SNCR	Utility Boiler - Coal/Wal	NOX	7.0000
N00102	NGR	Utility Boiler - Coal/Wal	NOX	3.5500
N00103	SNCR	Utility Boiler - Coal/Wal	NOX	7.0000
N00201	SNCR	Utility Boiler - Coal/Tergetial	NOX	7.0000
N00202	NGR	Utility Boiler - Coal/Tercertial	NOX	3.5500

Modified Controls

Control Efficiency	Electric	Normal	Opera	Main	Plant	QA Message
50.000	0.000	3.000	0.000	0.000	3	
50.000	0.000	3.000	0.000	0.000	3	
75.000	0.000	3.000	0.000	0.000	3	
1.000	0.000	3.000	0.000	0.000	15	Warning: Cost Efficiency should be greater than 50.000 and less than 55.000
3.000	0.030	7.000	0.000	0.000	27	Error: Cost Efficiency must be greater than 0.000 and less than 100.000 Warning: C
50.000	0.000	3.000	0.000	0.000	15	

Buttons: Add, Remove, OK, Save, Close

ACN - Load Control Set

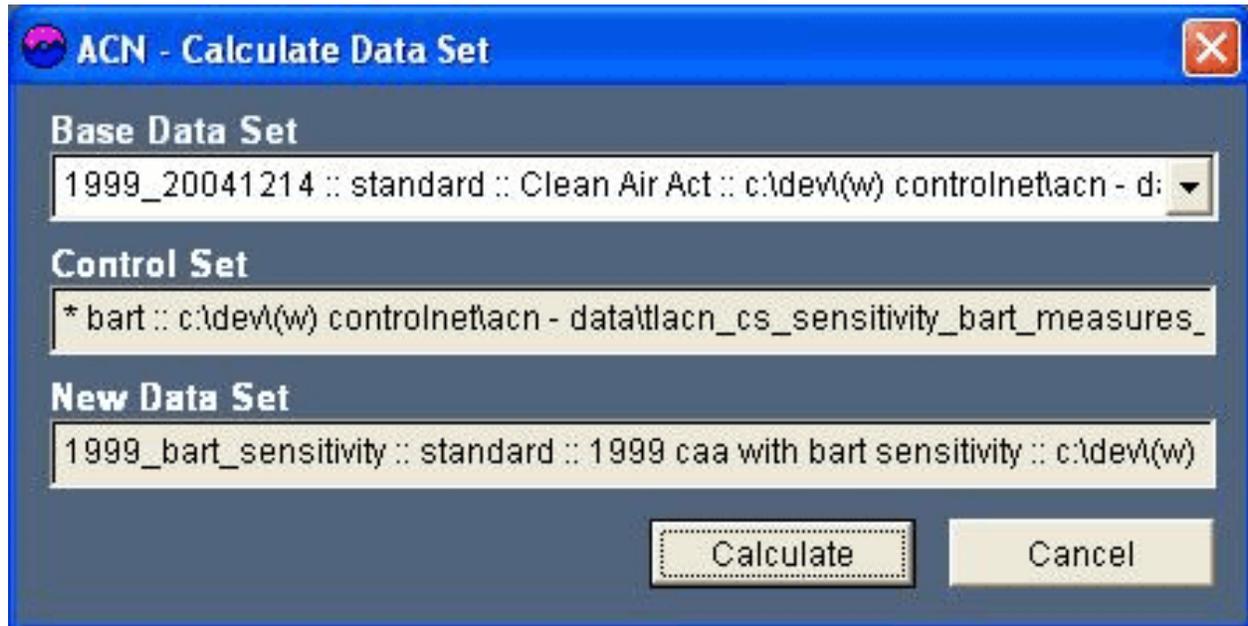
Description: bart

Path: c:\dev\w\controlnet\acn - data\l\acn_cs_sensitivity_test

Buttons: Browse, Load, Cancel

Figure II-12. Load Control Set Window

Figure II-13. Calculate Data Set Window



Step 2 Create new sensitivity control set

Upon selection of “New” command, you will be presented with “New Sensitivity Control Set” interface having two control grids, “Existing Controls” and “Modified Controls”, as shown in Figure II-9. Upper “Existing Controls” grid is populated with existing control measures within AirControlNET. You select control measure to be modified from the “Existing Controls” grid and click “Add” to add it to the “Modified Control” grid. Repeat this, to add all the desired controls to “Modify Controls” grid. Controls added to “Modified Controls” grid are grayed out in “Existing Control” grid. You change the parameter values for the controls in “Modify Controls” grid by typing in new values. You can remove the control from “Modified Control” grid by selecting it and clicking “Remove” button on the interface. For our example, select controls as shown in Figure II-10. Modify parameter values of selected controls as desired.

Step 3 Select QA command to verify the data for quality assurance

To verify the entered information, select “QA” command on the interface. Any erroneous data will be marked with red color and any warning will be marked with yellow color. QA messages would be displayed in the extreme right column of “Modified Controls” grid as shown in Figure II-11. All the errors have to be rectified before you can save the control set.

Step 4 Select Save command to save the control set

Select the Save command to save modified control measures. Upon selection, you will be asked for table name and location to save the new control set. Enter the control set name and browse the location to save control set as desired. Select “Close” command to close “New Sensitivity Control Set” interface. Upon closing the interface, you will be prompted to enter description for the new control set. Newly created control set would be loaded into AirControlNET.

Step 5 Create new data set for newly created control set

Select newly created control set in Control Set tool. Click “New Data Set” command to create new data set from the selected control set in conjunction with base data set. You will be prompted with the new data set information- browse for the new data set’s path and set name and description. The new data set interface as shown in Figure II-13 displays the selected control set, the new data set information, and prompts you to select the base data set. Clicking “Calculate” will calculate the new data set and add it to data set tool.

3. Mobile Measures Tool

The Mobile Module Tool is used to create new mobile source control measures that can subsequently be used in AirControlNET analyses. New mobile measures are developed from user provided changes to motor vehicle activity (i.e., VMT) and emissions by vehicle class and year as illustrated in the

example below. Newly created data sets can subsequently be used in the Control Scenarios, Least Cost, and Reporting Modules. They can also be combined with other existing data sets.

When activated, the mobile measure tool displays all previously saved mobile measure information (measure code, measure description, source, pollutant, base year, and cost year) in the grid shown in Figure II-14. The tool allows you to add new mobile source control measures to AirControlNET by editing the values in the top panel and then clicking the “Add” button. You may delete any unsaved measures by selecting a measure and clicking the “Remove” button. To save the mobile measures that are displayed in the grid, click the “Save” Button.

By selecting a measure and clicking the “Edit Data” button, a mobile data window is displayed as shown in Figure II-15. This interface displays the read-only selected measure information and controls to view, add, and remove measure data. To the left of the grid, there are three vehicle information controls: a vehicle class radio button group, a vehicle type listbox, and a vehicle model year/age listbox. The vehicle class radio button refreshes the vehicle type listbox - all vehicle types for the selected vehicle class are displayed in this listbox. The grid can only contain vehicle types from one class so if the vehicle class is changed, the grid is reset. The vehicle model year/age list box contains entries related to the selected measures base year. Along with the “All” entry, there are 25 model years/ages from ranging from 0 years old (the base year) to 24 years old. You may select multiple model years excluding the “All” entry. Once at least one vehicle type and model year/age have been selected, you may add the data to the grid by clicking the “Add” button. All grid entries must have the same vehicle model year/age. So, once an entry has been added to the grid, all subsequent vehicle types must use the same vehicle model year/age sets. Mobile measure data can be either reduce VMT or pollutant emissions which is indicated by the “VMT Reduction” checkbox as percentage reductions (see Figures II-16 and Figures II-17). Table II-1 provides descriptions of the vehicle type abbreviations.

When you have entered all the desired mobile data you can save the grid values by clicking the “Save” button. An AirControlNET data set is created by clicking the “New Data Set” button that will prompt you for the new data set information. Calculating a new data set takes a significant amount of time.

Creating a New Mobile Source Control using the “Mobile Measures Tool”:

This section provides step-by-step instruction on how to create new mobile control measures using the tool. An example is provided to assist you with this application in tutorial fashion. Example considered for the tutorial is to create “Generic Mobile Control” control measure applicable to “All” model years; Vehicle Class -“Vehicle 8”; Vehicle Type - ”LDGV”; using 2001 as base year and 1999 as cost year. Control measure data - NOx and CO emissions reduction by 25% and cost of control is \$500 / vehicle.

Step 1: Select Mobile Measures Tool under Data tab from the main menu

On selection of Mobile Measures Tool , you will be presented with a Control measures grid with previously saved measure information, if any. Enter the new measure control information in the top panel of the display and click “Add” button on the interface to add new mobile source

Figure II-17. New Mobile Measure Data Window - Modifying VMT Reduction

ACN - New Mobile Control Set

Measure Code: MCB1B1 Measure Name: MOB1B1 Source Name: MOB1B1 Major Pollutant: V(MOC) Base Year: 2010 Cost Year: 2002

VMT Reduction

Vehicle Class:
 28 Vehicle Types
 17 Vehicle Types
 8 Vehicle Types

Vehicle Type:
 BUS
 HD3V2B
 HD3V
HD3DV
 HD3DT
 LD3V
 LG11
 LG22

Model Year (Age):
 A1
 2010 (0 years old)
 2009 (1 years old)
 2008 (2 years old)
 2007 (3 years old)
 2006 (4 years old)
 2005 (5 years old)
 2004 (6 years old)

Vehicle Type	Model Year (Age)	Vehicle Cost (\$/vehicle)	Gallon Cost (\$/gallon)	VMI Cost (\$/m)	VMI (%)	VOC (%)	NOx (%)	CO (%)	PM10 (%)	PM2.5 (%)
HD3V	2009 (1 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
HD3V	2008 (2 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
HD3V	2007 (3 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
HD3V	2006 (4 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
HD3V	2005 (5 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
HD3V	2004 (6 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
LD3V	2009 (1 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
LD3V	2008 (2 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00
LD3V	2007 (3 years old)	0.0000	3.0000	0.0000	0.00	0.00	0.00	0.00	0.00	0.00

Buttons: Add, Remove, Save, Cancel, New Data Set, Close

Table II-1. MOBILE6 Vehicle Classifications

Number	Abbreviation	Description
1	LDGV	Light-Duty Gasoline Vehicles (Passenger Cars)
2	LDGT1	Light-Duty Gasoline Trucks 1 (0-6,000 lbs. GVWR, 0-3,750 lbs. LVW)
3	LDGT2	Light-Duty Gasoline Trucks 2 (0-6,000 lbs. GVWR, 3,751-5,750 lbs. LVW)
4	LDGT3	Light-Duty Gasoline Trucks 3 (6,001-8,500 lbs. GVWR, 0-5,750 lbs. ALVW)
5	LDGT4	Light-Duty Gasoline Trucks 4 (6,001-8,500 lbs. GVWR, greater than 5,751 lbs. ALVW)
6	HDGV2b	Class 2b Heavy-Duty Gasoline Vehicles (8,501-10,000 lbs. GVWR)
7	HDGV3	Class 3 Heavy-Duty Gasoline Vehicles (10,001-14,000 lbs. GVWR)
8	HDGV4	Class 4 Heavy-Duty Gasoline Vehicles (14,001-16,000 lbs. GVWR)
9	HDGV5	Class 5 Heavy-Duty Gasoline Vehicles (16,001-19,500 lbs. GVWR)
10	HDGV6	Class 6 Heavy-Duty Gasoline Vehicles (19,501-26,000 lbs. GVWR)
11	HDGV7	Class 7 Heavy-Duty Gasoline Vehicles (26,001-33,000 lbs. GVWR)
12	HDGV8a	Class 8a Heavy-Duty Gasoline Vehicles (33,001-60,000 lbs. GVWR)
13	HDGV8b	Class 8b Heavy-Duty Gasoline Vehicles (>60,000 lbs. GVWR)
14	LDDV	Light-Duty Diesel Vehicles (Passenger Cars)
15	LDDT12	Light-Duty Diesel Trucks 1 and 2 (0-6,000 lbs. GVWR)
16	HDDV2b	Class 2b Heavy-Duty Diesel Vehicles (8,501-10,000 lbs. GVWR)
17	HDDV3	Class 3 Heavy-Duty Diesel Vehicles (10,001-14,000 lbs. GVWR)
18	HDDV4	Class 4 Heavy-Duty Diesel Vehicles (14,001-16,000 lbs. GVWR)
19	HDDV5	Class 5 Heavy-Duty Diesel Vehicles (16,001-19,500 lbs. GVWR)
20	HDDV6	Class 6 Heavy-Duty Diesel Vehicles (19,501-26,000 lbs. GVWR)
21	HDDV7	Class 7 Heavy-Duty Diesel Vehicles (26,001-33,000 lbs. GVWR)
22	HDDV8a	Class 8a Heavy-Duty Diesel Vehicles (33,001-60,000 lbs. GVWR)
23	HDDV8b	Class 8b Heavy-Duty Diesel Vehicles (>60,000 lbs. GVWR)
24	MC	Motorcycles (Gasoline)
25	HDGB	Gasoline Buses (School, Transit and Urban)
26	HDDBT	Diesel Transit and Urban Buses
27	HDDBS	Diesel School Buses
28	LDDT34	Light-Duty Diesel Trucks 3 and 4 (6,001-8,500 lbs. GVWR)

control measures into AirControlNET. You may delete any unsaved measures by selecting a measure and clicking the “Remove” button. To save the mobile measures displayed in the grid, click the “Save” Button. For our example, you add following information for the measure:

measure code: mOT9
measure description: Generic Mobile Control
source: LDGV
Major pollutant: NOx
base year: 2001
cost year: 1999

Step 2: Click Edit button to enter the data for the control measure

Select the newly added control measure in the Control Measure grid and click “Edit” Button to enter data for the control measure. The mobile data interface displays the read-only selected control measure information and controls to view, add, and remove measure data. In the left panel of the interface, there are three vehicle information controls: a vehicle class radio button group, a vehicle type listbox, and a vehicle model year/age listbox. The vehicle class radio button refreshes the vehicle type listbox - all vehicle types for the selected vehicle class are displayed in this listbox. The grid can only contain vehicle types from one class so if the vehicle class is changed, the grid is reset. The vehicle model year/age list box contains entries related to the selected measures base year. Along with the “All” entry, there are 25 model years/ages from ranging from 0 years old (the base year) to 24 years old. You may select multiple model years excluding the “All” entry. Once at least one vehicle type and model year/age have been selected, you may add the data to the grid by clicking the “Add” button. All grid entries must have the same vehicle model year/age. So, once an entry has been added to the grid, all subsequent vehicle types must use the same vehicle model year/age sets. Mobile measure data can be either reduce VMT or pollutant emissions which is indicated by the “VMT Reduction” checkbox.

For our example enter the following measure data:

Vehicle Class: “8 vehicle type”

Vehicle Type: “LDGV”

Model year (Age): All Click “Add” button to add this data to the grid

Enter 25% reduction for NOx and CO in the data grid and cost \$500/vehicle.

Step 3: Select QA command to verify data for quality assurance

To verify the entered information, select QA command on the interface. Any erroneous data will be marked with red color. Suggestions for the erroneous data will be displayed in “QA Message” column.

Select 4: Select New Data Set command to create new data set with newly created Control Measure

Select the “New Data Set” command to create a new data set to use with Control Scenario Module (CSM), Least Cost Module (LCM) and reporting module. On selecting command, you will be prompted to enter the data set name, description and path to save the data set.

4. Selecting Year for Reporting Costs

AirControlNET allows you the flexibility of selecting the year for reporting control costs. You have the option to select any year from 1990 through 2004. In order to select the desired reporting year, you must choose an option as located under Data from the AirControlNET toolbar menu as shown in Figure II-18. You may also change the reporting year within each AirControlNET module by selecting a different year from the toolbar menu within a module. Please note that 1999 is set as the default.

5. Use of Help from the AirControlNET Toolbar Menu

AirControlNET provides the Help option that allows you to consult this User Guide as a reference while working with this tool. You can access the help screen, as shown in Figure II-19, by selecting “AirControlNET Help” located under Help from the AirControlNET toolbar menu or by pressing the F1 function key.

B. SUMMARY OF AirControlNET MODULES

As shown in Figure II-1, the AirControlNET Main Interface provides you with the option to perform one the following functions by selecting the appropriate button:

- (1) Control Scenarios Module (CSM) that allows you to search the database and select individual control measures by pollutant, source, and geographic area to create a control strategy scenario with computed emissions reductions and associated costs. Please refer to Chapter III for details on using this module.
- (2) Least-Cost Module (LCM) that allows to obtain an emissions reduction scenario by source and geographic area consisting of the set of control measures that achieves a stated pollutant-specific emission reduction target (in tons or percentage) with the least amount of total annual costs. Please refer to Chapter IV for details on using this module.
- (3) Script Builder Module (SBM) that allows you to develop “control factor files” based on percent reductions by pollutant, source, and geographic area to create an emissions reduction scenario for input into the REMSAD-ST air quality model. Please refer to Chapter V for details on using this module.

Figure II-18. Selection of Control Cost Year Window

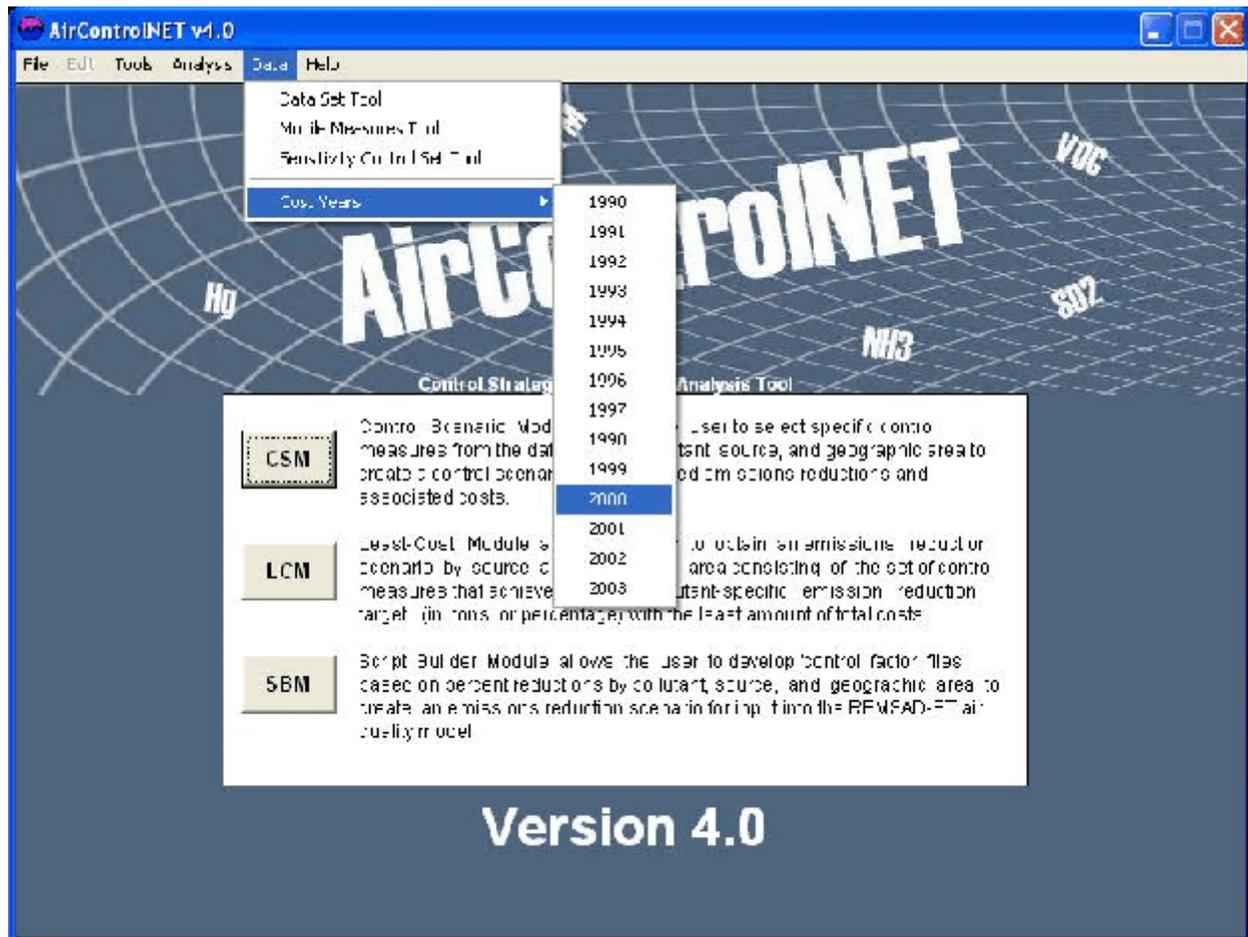


Figure II-19. Selection of AirControlNET Help Toolbar Window



You may also choose one of these AirControlNET modules under Tools from the AirControlNET toolbar menu. Please note that the Tools option found on the toolbar menu is available within each module so that you can return to the AirControlNET Main Interface or move directly to another module as desired.

Once your data query is complete, you may then export the data from the control scenario into text or spreadsheet format for further analysis or into an input script for air quality modeling within REMSAD-ST (Pechan and ENVIRON, 2001 and 2002).

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CHAPTER III. CONTROL SCENARIOS MODULE

The Control Scenarios Module provides the capability to query the database in a detailed fashion and create a control scenario as part of a control strategies and costing analysis. The interface for this module, as presented in Figure III-1, provides you with a query-based tool to evaluate the emission reductions and costs associated with implementing the chosen control measure(s). This module facilitates such queries through pre-set filters that allow you to define criteria for selection of control measures and create a data set that may consist of a wide range of pollution control measures at various costs, applicability, and control efficiencies. This chapter begins by introducing you to the interface for the Control Scenario Module and provides details on the available data query options. Examples are provided to better illustrate these capabilities. The chapter concludes by presenting the options for exporting data and reporting the query results.

A. OVERVIEW OF CONTROL SCENARIOS MODULE INTERFACE

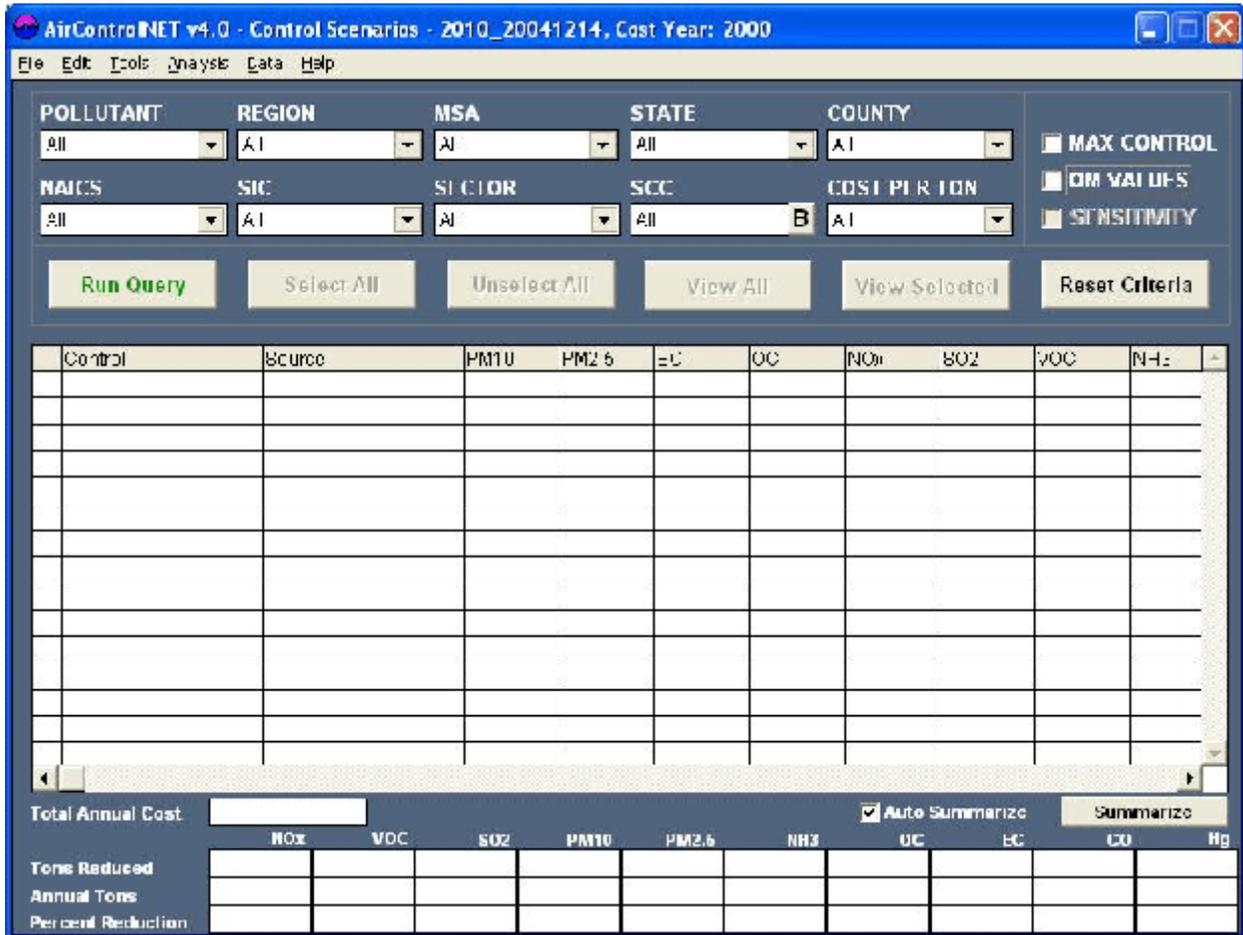
Upon selecting this module from the AirControlNET Main Interface, you are presented with the Control Scenarios Module Interface as shown in Figure III-1. There are four important components of this interface that you must be familiar with in order to create a control scenario. As described below, these components include Filtering Criteria, User Commands, Database Grid, and Control Summary.

Filtering Criteria: The Filtering Criteria section allows you to create the set of control measures to be included as part of your control strategy and costing analysis. Based on your selections of filtering criteria, the control measures are displayed in the database grid. The wide range of drop down combo boxes gives you the ability to filter the database according to your specific requirements. Once you have selected the desired combination of filtering criteria, you can apply the User Commands as described below to reduce the number of control measures shown within the Database Grid.

User Commands: The User Commands section of the interface provides you with different query options to facilitate creating control scenarios. After you have chosen the conditions for which the scenario is being created, the Run Query command executes the selected filters and displays individual control measures matching those criteria in the Database Grid (described below). The next four commands—Select All, Unselect All, View All, and View Selected—are designed to give you further capabilities to narrow or expand the control measures of interest. The remaining command button—Reset Criteria—allows you to reset the filtering criteria and begin a new filtering and/or selection process.

Database Grid: The Database Grid displays the individual control measures that are contained with the AirControlNET database (Please refer to the AirControlNET Development report for details on the development of this database). Each row entry displayed in this grid represents an individual control measure as applied to a particular source. You may experience some delays

Figure III-1. Control Scenarios Module Interface



updating this grid due to the large database being accessed. Based on the filtering criteria that you select for a data query, this grid area will display those control measures that match the selected criteria. You can then individually select those control measures of interest within the Database Grid by checking the "Add" checkbox field located to the far left of the grid area or use the appropriate User Command to more broadly select a set of control measures. The individual fields contained within this grid are listed and defined in Appendix A. You can sort the data displayed in the database grid by clicking shift or control and the column header (shift + column header sorts a62, control + column header sorts 26a).

Control Summary: The Control Summary section provides you with useful summary or aggregate calculations based on the selected control measures within the Database Grid. These summary results should help you to target a goal when selecting multiple control measures. This summary information is updated automatically when the Auto Summarize option is selected or can be manually updated using the Summarize button.

1. Filtering Criteria Fields

These fields are shown in Figure III-1 across the top of the Control Scenarios Module interface and provide drop-down menus with the various criteria for you to select. Applying these filters queries the database and results in the Database Grid displaying only those emission control measures that match the selected criteria.

Pollutant—This field lists the available pollutants including PM₁₀, PM_{2.5}, EC, OC, NO_x, SO₂, VOC, NH₃, CO, and Hg.

Region—This field lists a range of broad regions that are typical of regulatory and policy analysis including:

- ! Eastern and Western continental United States. Eastern States are the 37 OTAG States, defined as all states east of or touching the 100° line of longitude.
- ! The Ozone Transport Commission (OTC) <http://www.otcair.org/>
- ! Southern Appalachian Mountain Initiative (SAMI)
- ! Regional Planning Organizations (RPOs) such as WRAP, WESTAR, LADCO, NESCAUM, MARAMA, CENSARA, and SESARM (<http://www.epa.gov/air/visibility/regional.html>)
- ! North American Electric Reliability Council (NERC) Regions, including ECAR, ERCOT, MAAC, MAIN, MAPP, NPCC, FRCC, SERC, SPP, and WSCC (<http://www.nerc.com/>)

MSA—This field lists the Metropolitan Statistical Areas (MSAs). The MSA field includes micropolitan and consolidated areas. Further information on MSA definitions can be obtained from the U.S. Census Bureau website at <http://www.census.gov/population/www/estimates/metroarea.html>.

State—This field lists all 50 U.S. States and the District of Columbia. If an MSA is selected, then only those States in that area will be available through the menu box.

County—This field lists all U.S. Counties. If a State or MSA is selected, then only those counties in that area will be available through the menu box.

Cost Per Ton—This field provides a list of threshold criteria for the cost per ton of pollutant emissions reduced that range from less than \$1,000 per ton to less than \$20,000 per ton. Cost refers to the total annual cost of the subject control measure.

NAICS—This field lists 3-digit North American Industry Classification System (NAICS) codes that identify broad industrial sectors across the United States. NAICS definitions (2002 Revisions) can be accessed from the U.S. Census Bureau website at <http://www.census.gov/epcd/naics02>.

SIC—This field lists 2-digit Standard Industrial Classification (SIC) codes that identify broad industrial sectors across the United States. SIC look-up tables can be obtained from the U.S. Census Bureau at <http://www.census.gov/epcd/www/naicstab.htm>.

Sector—This field lists broad Sectors of emission sources including Utilities (by fuel), Nonutility (by fuel), Area, Onroad mobile (by gas or diesel), and Nonroad (by gas or diesel). Please note that not all Sectors have available control measures.

SCC—This field lists 8-digit Source Classification Codes (SCC). If a Sector is selected, then only SCCs that correspond to that Sector will be displayed.

Please note that these filtering criteria fields are not mutually exclusive so that not all fields may be used in conjunction with each other as shown in Figure III-2.

Figure III-2. Possible Combinations of Criteria Fields

The Filtering Criteria Fields also includes a "MAX CONTROL" checkbox that provides you with the capabilities of automatically applying the most stringent control measure on a source for the pollutant of interest without respect to costs. The most stringent control is defined as that control measure achieving the highest percentage of emissions reductions. Once you have created your control scenario using the filtering criteria, you can select this button and re-select the *Run Query* command to re-filter the control measures displayed in the Database Grid to include only the most stringent control measures.

Along with the criteria filtering controls, there are two data manipulation check boxes labeled "OM Values" and "Sensitivity". OM is an abbreviation for operating and maintenance costs. When the "OM Values" check box is clicked, the OM Value columns are calculated. When the "Sensitivity" checkbox is checked, the currently selected control set is used to recalculate the pollutant reductions and costs. This checkbox is greyed out if there is no currently selected control set.

2. User Commands

As shown in Figure III-1, the following command buttons are provided just below the Filtering Criteria area and allow you to apply the specified filters in querying the database and creating a control strategies scenario.

Run Query—This command queries the database and then displays in the Database Grid all of those control measures that match the criteria combination selected in the Filtering Criteria section.

	State	County	MSA	Region	SIC	NAICS	Sector	SCC	Cost per Ton
State
County
MSA	
Region
SIC
NAICS
Sector
SCC
Cost per Ton

Select All—This command selects all emission control measures displayed within the grid, i.e., checks the Add box for all displayed control measures. This command saves you from having to check every "Add" box manually, which would be a time consuming task when selecting a multitude of control measures.

Unselect All—This command unselects all emission control measures displayed within the grid, i.e., unchecks the "Add" box for all displayed control measures.

View All—This command displays all of the emission control measures from the most recent query within the Database Grid both selected and unselected.

View Selected—This command displays current and previously selected emission control measures within the Database Grid. That is, those control measures for which the "Add" box is currently or had been previously checked in creating a control strategy.

Reset Criteria—This command returns the Control Scenarios Module interface to the initial start-up state. That is, all filtering criteria fields are returned to defaults.

3. Control Summary Fields

The following fields are shown across the bottom of the Control Scenarios Module interface and provide useful summary information by pollutant based on the control measure selections as displayed within the Database Grid.

Tons Reduced—This field provides the sum of the emissions reduced in absolute terms (tons) for the selected emission control measures.

Annual Tons—This field provides the sum of the emissions for which controls are applicable (i.e., controllable tons rather than total emissions) for the selected emission control measures.

Percent Reduction—This field provides the ratio of the Tons Reduced to Annual Tons for the selected emission control measures.

Total Cost—This field provides the sum of the Total Cost values across all of the selected emission control measures.

These Summary Fields are controlled by the "Auto Summarize" checkbox and the "Summarize" command. When the Auto Summarize checkbox is selected, each of the fields is automatically refreshed when additional records are selected (or deselected) within the Database Grid. When the "Auto Summarize" checkbox is not selected, records can be selected and deselected without updating the Summary Fields. In this case, the "Summarize" command can be used to update the fields as desired.

B. CREATING A CONTROL SCENARIO

This section provides step-by-step instructions on how to create a control strategy scenario using this module. An example is provided throughout these instructions to assist you with this application in tutorial fashion. Defining a control strategies scenario is a cumulative process within AirControlNET. In summary, the process begins by applying the filtering criteria to query the control measures database and then selecting the control measures of interest within the Database Grid display for inclusion in a control strategy scenario. You can then save and export the resulting database or repeat this process multiple times to accumulate all of the control measures to be part of the control strategy scenario. The Control Scenarios Module interface facilitates and simplifies this process for you as detailed in the remainder of this section.

Please note that you can begin this process by opening a previously saved control strategies scenario by selecting Open from the Control Scenarios Module toolbar menu. The Open Scenario Dialog will appear so that you can open the desired scenario file as a starting point in creating your new control strategies scenario. Once selected, the Database Grid should now be populated with the corresponding control measures.

The following generic steps illustrate how to create a control scenario within the Control Scenarios Module:

Step 1: Apply Filtering Criteria to Define Query of Control Measures Database

You begin the process of creating a control strategies scenario by applying the appropriate filtering criteria to select those control measures that match the criteria of interest. The interface facilitates these selections so that defining the query is a simple process involving your selection of the desired filtering criteria from the drop-down menus. Please note, as shown in Figure III-2, the filtering criteria fields are not all mutually exclusive. Figure III-3 shows the example where the following filtering criteria were selected for the data query:

Pollutant = NO_x
Region = Eastern United States
Sector = Coal-fired Electric Utilities

Step 2: Select Run Query Command to Initiate Query of Control Measures Database

You initiate the query of the control measures database by selecting the Run Query command. The matching control measures will then be displayed within the Database Grid area. Figure III-4 shows, for the example query from Step 1 above, the resulting records as displayed in the Database Grid for you to make further refinements, if necessary, as part of creating the control strategies scenario. The resulting Database Grid shown in Figure III-4 includes the records for NO_x control measures available in AirControlNET that are applicable to Coal-fired Electric Utilities located in the Eastern United States.

Step 3: Select Individual Control Measures within Database Grid

Once the Database Grid contains the potential control measures of interest, you can select individual control measures to include in your scenario by clicking the corresponding "Add" checkbox within the display grid. This checkbox is found in the first column on the left-hand side of the display grid. Once you have selected individual control measures, then emission reductions and cost results will be displayed in the Control Summary section of the interface. To facilitate this selection process, you can apply the Select All query command to check all of the control measures within the display grid and Unselect All to uncheck all selections. In addition, you can sort the displayed control measures by clicking on the desired column heading within the Database Grid. Reviewing these results can be used to determine whether your requirements are satisfied in terms of emission reductions (tons or percent) by pollutant.

As shown in Figure III-5, the database has been sorted by the "Control" column and then selected all "NGR" controls within the Database Grid. Selecting these control measures results in a 108,496 ton reduction in NO_x emissions, a 43.17% reduction (as shown in Control Summary section).

Figure III-4. Control Scenario Database Grid After Running Query

AirControlNET v4.0 - Control Scenarios - 2010_20041214, Cost Year: 2000

File Edit Tools Analysis Data Help

POLLUTANT: NOx REGION: Eastern US MSA: AL STATE: All COUNTY: AL

NAICS: All SIC: All SIC10R: --Utility-- Sub SCC: All CDSI P R I O N: B A I

MAX CONTROL
OM VALUERS
SENSITIVITY

Run Query Select All Unselect All View All View Selected Reset Criteria

Control	Source	PM10	PM2.5	CO	OC	NOx	SO2	VOC	NH3	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1497.74	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	2490.07	6540.79	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1790.08	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	2483.48	6513.54	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1490.04	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	2480.73	6500.78	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1485.27	0.000	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	2097.12	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	2310.70	46329.7	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	274.599	0.000	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1000.00	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	457.635	4210.03	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	300.158	0.000	0.000	0.000	
<input type="checkbox"/> SCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1100.00	0.000	0.000	0.000	
<input type="checkbox"/> Repowering	Utility Boiler - Coal-Fire	0.000	0.000	0.000	0.000	600.230	4340.70	0.000	0.000	

Total Annual Cost: 00 Auto Summarize Summarize

	NOx	VOC	SO2	PM10	PM2.5	NH3	CO	OC	CU	Hg
Tons Reduced	0	0	0	0	0	0	0	0	0	0.00000
Annual Tons	0	0	0	0	0	0	0	0	0	0.00000
Percent Reduction	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %

Figure III-5. Database Grid and Summary Fields with Selected NO_x Controls

AirControlNET v4.0 - Control Scenarios - 2010_20041214, Cost Year: 2000

File Edit Tools Analysis Data Help

POLLUTANT: NO_x REGION: Eastern US MSA: AL STATE: All COUNTY: AL

NAICS: All SIC: All SIC10R: --Utility-- Coal SCC: All CDSI PER IDN: B A1

MAX CONTROL
DIM VALUES
SENSITIVITY

Run Query Select All Unselect All View All View Selected Reset Criteria

Control	Source	PM10	PM2.5	SO ₂	CO	NO _x	SO ₂	VOC	NH ₃
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	557.071	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	600.000	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	1081.70	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	325.400	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	30.000	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Cyclone	0.000	0.000	0.000	0.000	1534.71	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Cyclone	0.000	0.000	0.000	0.000	1465.34	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	592.075	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	434.953	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	99.300	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	89.212	0.000	0.000	0.000
<input checked="" type="checkbox"/>	NGR Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	122.638	0.000	0.000	0.000
<input type="checkbox"/>	Repowering Utility Boilers - Coal-Fire	0.000	0.000	0.000	0.000	2795.37	6513.79	0.000	0.000
<input type="checkbox"/>	Repowering Utility Boilers - Coal-Fire	0.000	0.000	0.000	0.000	2487.48	6513.54	0.000	0.000
<input type="checkbox"/>	Repowering Utility Boilers - Coal-Fire	0.000	0.000	0.000	0.000	2487.73	6520.78	0.000	0.000

Total Annual Cost: \$1,002,271,930 Auto Summarize Summarize

	NO _x	VOC	SO ₂	PM10	PM2.5	NH ₃	CO	HC	LD	Hg
Tons Reduced	100,450	0	0	0	0	0	0	0	0	0.0000
Annual Tons	261,255	0	0	0	0	0	0	0	0.0073	0.0000
Percent Reduction	40.17 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %	0.00 %

You can now select the View Selected command to view only the selected controls, i.e., only the "NGR" control measures with "Add" checkbox selected. Selecting the View All command allows you to toggle back to the previous Database Grid and display both selected and unselected control measures from the current user query.

At this point, you may have completely defined your control strategy scenario by completing the 3 steps described thus far. If so, then you can refer forward to Section C "Saving a Control Scenario" and Section D "Exporting and Reporting." However, as noted previously, the creation of a scenario can be a cumulative process in that additional controls can be added to this initial set of control measures. In this case, you can refer to the next step that describes combining multiple sets in creating the overall control strategy scenario.

Step 4: Continue Selection of Individual Control Measures

To make additions to the current scenario, you must first select the *Reset Criteria* command that will eliminate previous filtering criteria to begin the process from Step 1 above. For our example, the filtering criteria have been reset and then the following filtering criteria were selected, as shown in Figure III-6, as part of the additional query:

Pollutant = SO₂
Region = Western United States
Sector = Coal-fired Electric Utilities

As shown in Figure III-6, the database has been sorted by the "Control" column and then the Select All command was used to select all control measures displayed within the Database Grid, i.e., all "FDG Wet Scrubbers." The addition of these control measures results in a reduction of SO₂ emissions of 109,883 tons (as shown in Control Summary section).

You can now select the View Selected command to view *all* of the selected controls, i.e., the initial and subsequent sets of control measures. As shown in Figure III-7, the Database Grid now displays the initial "NO_x control measure" set and the most recent "SO₂ control measure" set. All of these control measures will remain selected and part of the control strategy scenario until the "Add" checkbox is deselected or the application is terminated.

Please note that the Control Summary section will continue to record the emission reductions and cost results across pollutants for *all* of the selected control measures. This cumulative tracking of results should assist you in creating your control strategy scenario and to be sure control measures of interest are still selected or confirm that they were deselected. Selecting the View All command allows you to toggle back to the previous Database Grid and display both selected and unselected control measures from the most recent user query. This step may be repeated indefinitely until you have created your control strategy scenario. Once the scenario is completely defined, then you can refer forward to Section C "Saving a Control Scenario" and Section D "Exporting and Reporting."

Figure III-6. Database Grid and Summary Fields with Selected NO_x and SO₂ Controls

AirControlNET v4.0 - Control Scenarios - 2010_20041214, Cost Year: 2000

File Edit Tools Analyse Data Help

POLLUTANT: NO₂ REGION: Western J.T. MSA: AL STATE: All COUNTY: AL

NAICS: All SIC: AI SIC100R: --Utility-- Coal SCC: All CDS1 PER IDN: B AI

MAX CONTROL DIM VALUES SIMSITIVITY

Run Query Select All Unselect All View All View Selected Reset Criteria

Control	Source	PM10	PM2.5	SO ₂	CO	NO _x	SO ₂	VOC	NH ₃	
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	7.700	0.000	0.000	0.000	249.140	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	675.227	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	1752.82	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	9030.78	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	2654.70	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	3913.47	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	2429.28	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	7.700	0.000	0.000	0.000	14705.0	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	383.710	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	1035.2	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	7.700	0.000	0.000	0.000	5372.10	0.000	0.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sulf	0.000	3.300	0.000	0.000	0.000	7538.73	0.000	0.000
<input type="checkbox"/>	Repowering	Utility Boilers - Coal-Fired	0.000	3.300	0.000	0.000	2752.17	3713.64	0.000	0.000
<input type="checkbox"/>	Repowering	Utility Boilers - Coal-Fired	0.000	7.700	0.000	0.000	5094.76	3712.18	0.000	0.000
<input type="checkbox"/>	Repowering	Utility Boilers - Coal-Fired	0.000	3.300	0.000	0.000	2512.73	6915.77	0.000	0.000

Total Annual Cost: \$352,370,720 Auto Summarize Summarize

	NO _x	VOC	SO ₂	PM10	PM2.5	NH ₃	CO	HC	CU	Hg
Tons Reduced	100,450	0	109,000	270	90	7	1	0	7	0.00000
Annual Tons	251,255	0	147,907	570	250	3	2	2	40,009	0.00000
Percent Reduction	40.17 %	0.00 %	74.25 %	35.00 %	35.00 %	3.00 %	35.00 %	35.00 %	3.00 %	0.00 %

Figure III-7. Database Grid After View Selected Command

AirControlNET v4.0 - Control Scenarios - 2010_20041214, Cost Year: 2000

File Edit Tools Analysis Data Help

POLLUTANT: REGION: MSA: STATE: COUNTY: MAX CONTROL

NAICS: SIC: SIC IND: SCC: CDSI PER IDN: DIM VAL UFS SENSITIVITY

Control	Source	PM10	PM2.5	SO ₂	CO	NO _x	SO ₂	VOC	NH ₃	
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	2854.73	C.000	C.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	3910.47	C.000	C.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	2139.28	L.L00	L.L00
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	14385.3	C.000	C.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	303.710	C.000	C.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	10.627	L.L00	L.L00
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	5372.10	C.000	C.000
<input checked="" type="checkbox"/>	FGD Wet Scrubber	Utility Boilers - Medium Sul	0.000	0.000	0.000	0.000	0.000	7770.73	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Tangent	0.000	0.000	0.000	0.000	153.138	J.J00	L.L00	L.L00
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	100.300	0.000	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Tangent	0.000	0.000	0.000	0.000	254.100	0.000	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	162.636	0.000	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Tangent	0.000	0.000	0.000	0.000	427.229	0.000	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Wall	0.000	0.000	0.000	0.000	271.650	0.000	C.000	C.000
<input checked="" type="checkbox"/>	NCR	Utility Boiler - Coal/Tangent	0.000	0.000	0.000	0.000	747.738	0.000	C.000	C.000

Total Annual Cost: Auto Summarize

	NO _x	VOC	SO ₂	PM10	PM2.5	NH ₃	CO	HC	LD	Hg
Tons Reduced	100,450	0	109,000	270	90	7	1	0	7	C.00000
Annual Tons	251,255	0	147,907	570	250	3	2	2	40,039	C.00000
Percent Reduction	40.17 %	0.00 %	74.25 %	35.00 %	35.00 %	3.00 %	35.00 %	35.01 %	3.00 %	C.00 %

1. Maximum Control Scenario

For many emission sources, AirControlNET contains more than a single control measure and these can each have a different degree of control efficiency. As described in Section A.1 of this chapter, the Filtering Criteria Fields of the Control Scenarios Module interface includes a "MAX CONTROL" checkbox that allows you to automatically apply the most stringent control measure on a source for the pollutant of interest without respect to costs. The most stringent control is defined as that control measure achieving the highest percentage of emissions reductions. Once you have created your control strategies scenario using the filtering criteria, you can select the MAX CONTROL button and then re-select the Run Query command causing AirControlNET to re-filter the control measures displayed in the Database Grid and include only the most stringent control measures.

As shown in Figure III-8, the MAX CONTROL button has been selected for our previous example that includes both NO_x and SO₂ control measures across Coal-fired Electric Utilities in the Eastern and Western United States, respectively. The results are displayed within the Database Grid and the Control Summary section reflects the associated changes in emission reductions and costs. If this completely defines the control scenario, then you can refer forward to Section C "Saving a Control Scenario" and Section D "Exporting and Reporting." If not, then you can refer back to Step 4 above to continue adding control measures to the current maximum control scenario.

2. Operating and Maintenance (O&M) Cost Values

In AirControlNET, O&M cost information is available for many control measures. This O&M costs can be view in AirControlNET by selecting the O&M checkbox and running the data query with required filtering criteria (see Figure III-9). Following components of O&M cost can be viewed in the data grid : Operating Labor Cost, Maintenance cost, Supervisor cost, Maintenance material cost, Replacement Cost, Electricity Cost, Steam Cost, Fuel Cost, Waste Disposal Cost, Chemical Cost, Other Raw Material Cost, Other Utility Cost, Total Direct Annual Cost, Overhead Cost, Administrative Cost, Property Tax Cost, Insurance Cost, and Total Indirect Annual Cost. Note that not every cost is available for each control measure.

3. On-the-fly Sensitivity Calculation

If a default control set has been selected in the Control Set Tool, the "Sensitivity" checkbox will be enabled. When checked and the "Run Query" button is clicked, the grid results will contain only the measures specified in the selected control set. Furthermore, the control set's modified measure values will alter the reduction and cost values in the grid. The resulting screen is shown in Figure III-10.

Figure III-8. Maximum Control Scenario



Figure III-9. O&M Cost Component Values For Control Measures

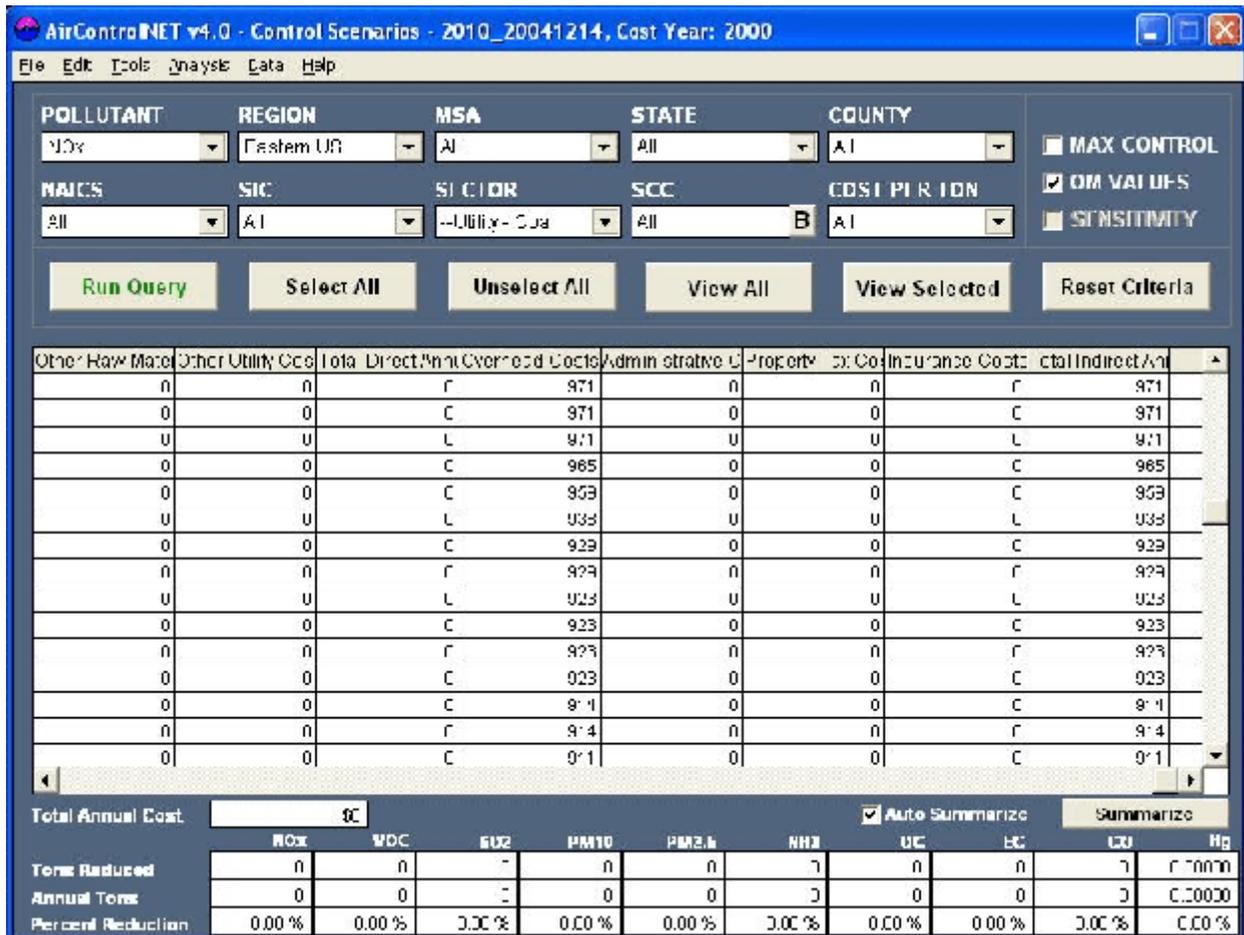
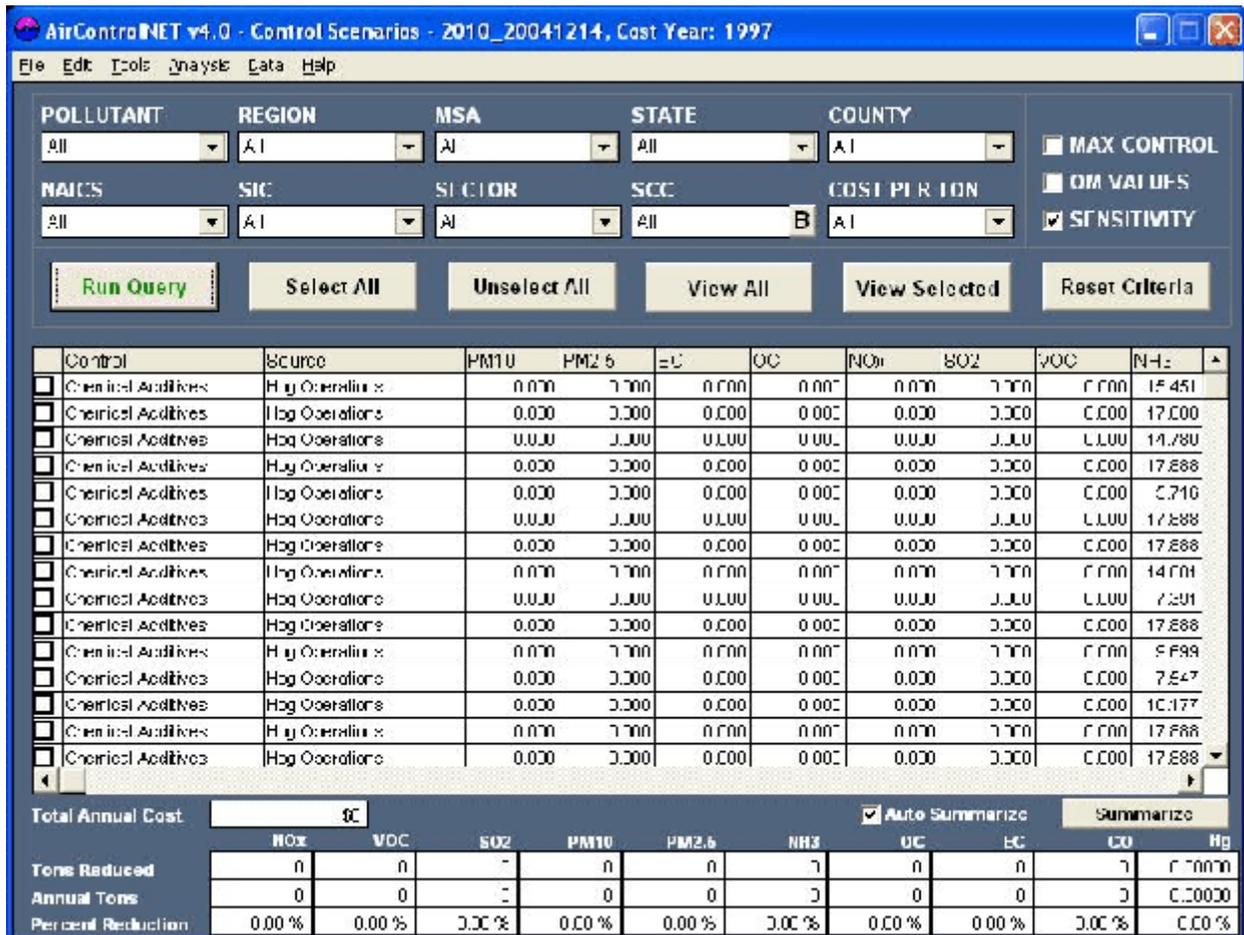


Figure III-10. On-the-fly Sensitivity Calculation for Control Measures



C. SAVING A CONTROL SCENARIO

To save a control strategy scenario, you can select “Save As” under File from the Control Scenarios Module toolbar menu. Please note that before saving a scenario it is advisable to view the currently selected control measures by clicking the View Selected command to confirm that the data set matches the desired criteria. Upon selecting “Save As” under the File toolbar item, the Control Scenario File “Save As” Dialog box will appear as shown in Figure III-11. The default path will be the AirControlNET directory folder. You should define the scenario file name and then save it by selecting the Save button. Control scenario files should be saved with a “CCS” file extension to facilitate their identification.

D. EXPORTING AND REPORTING

This section provides instructions on the exporting and reporting of a control strategies scenario.

1. Exporting Data from a Control Scenario

By selecting Export under File from the interface toolbar menu, you can export the following types of data files reflecting the control scenario for use in subsequent analysis:

- ! Measure File. You can export the current scenario displayed in the Database Grid to a range of file formats, namely Dbase (*.DBF), Excel spreadsheet (*.XLS), or text file (*.TXT). You simply select Measure File after selecting Export under File from the interface toolbar menu. The Measure File “Save As” Dialog box will appear as shown in Figure III-12. The default path will be the AirControlNET directory folder. You should define the measure file name and then save by clicking the Save button. The measure file will then be created and available for further analysis. Please note that Excel files are limited to 16,383 rows. Use a different export format if you control measure grid contains more than 16,382 data records.
- ! REMSAD-ST Script File. You can export the emission reductions information into a control factors file, or input script, for the REMSAD-ST air quality model. You simply select REMSAD-ST Script under Export from the interface toolbar menu. The REMSAD-ST Script “Save As” Dialog box will appear as shown in Figure III-13. The default path will be the AirControlNET directory folder. You can define the REMSAD-ST input script file name and then save by clicking the Save button. This file must be saved as a text file (*.TXT). You will be prompted separately to provide "user name" and "scenario description" for documentation purposes (more details with screen shots are available in Chapter V). This file will then be created and available for use in the REMSAD-ST air quality model.

Figure III-11. Control Scenario File Save As Dialog Box

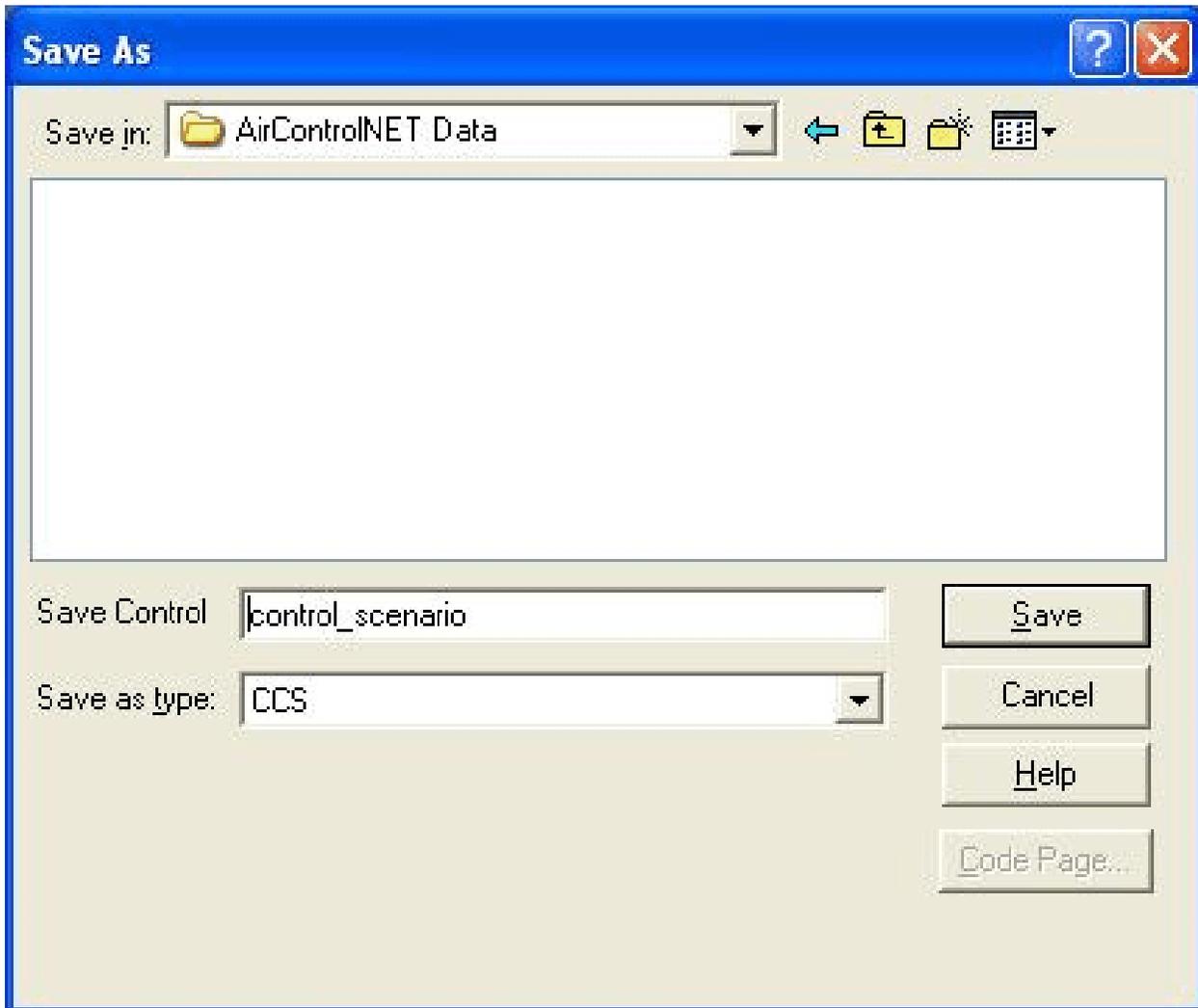


Figure III-12. Measure File Save As Dialog Box

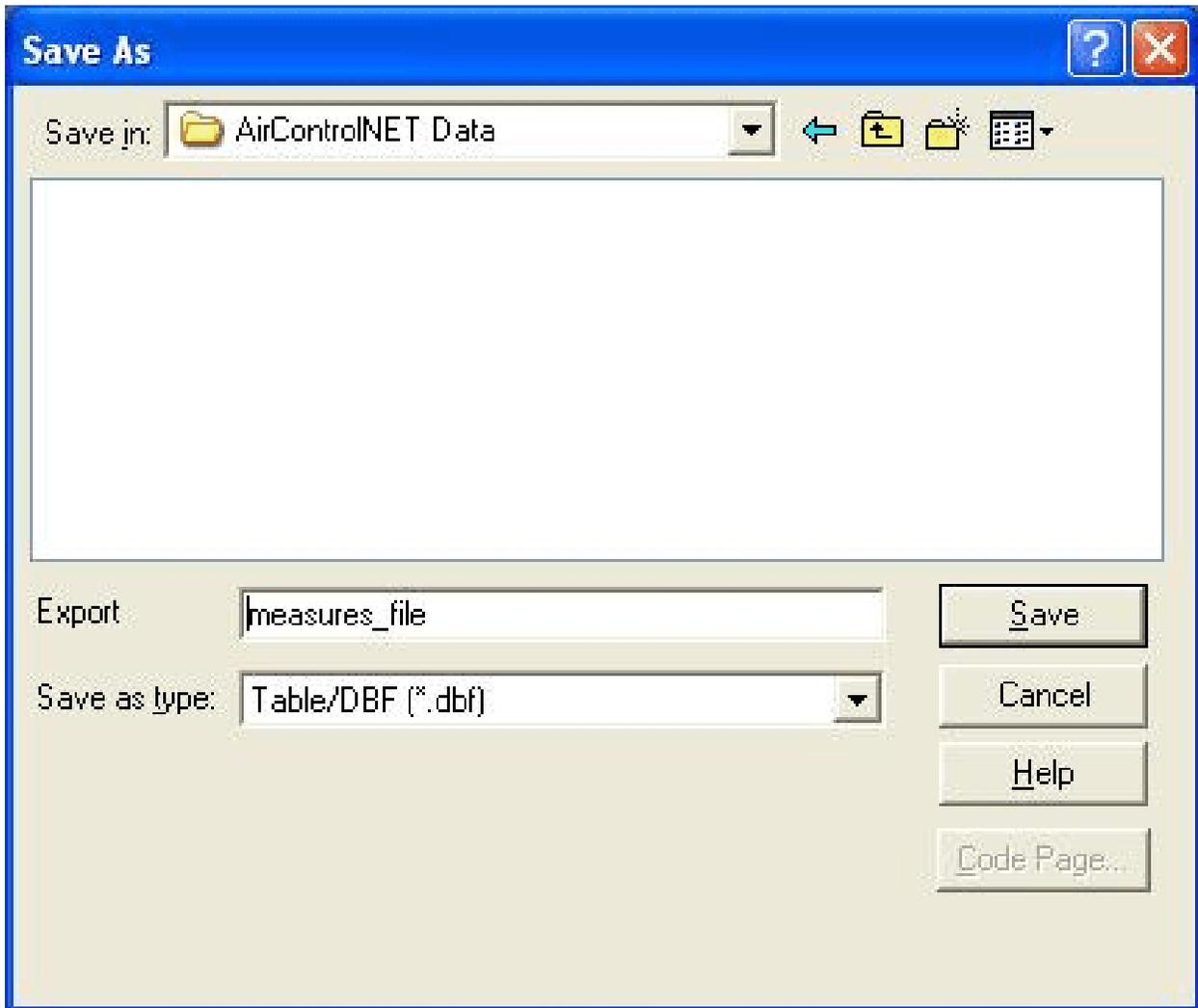
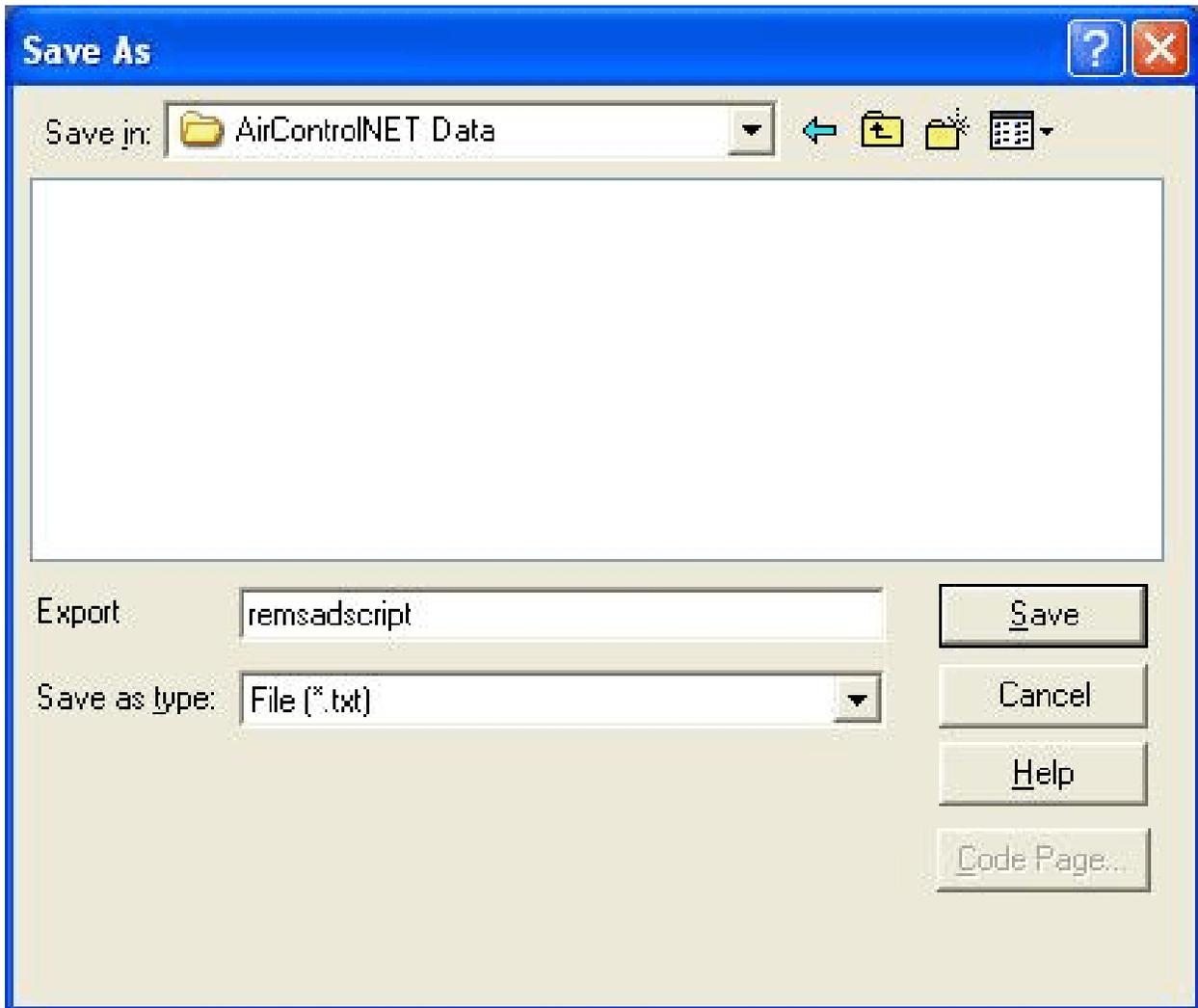


Figure III-13. REMSAD-ST Script Save As Dialog Box



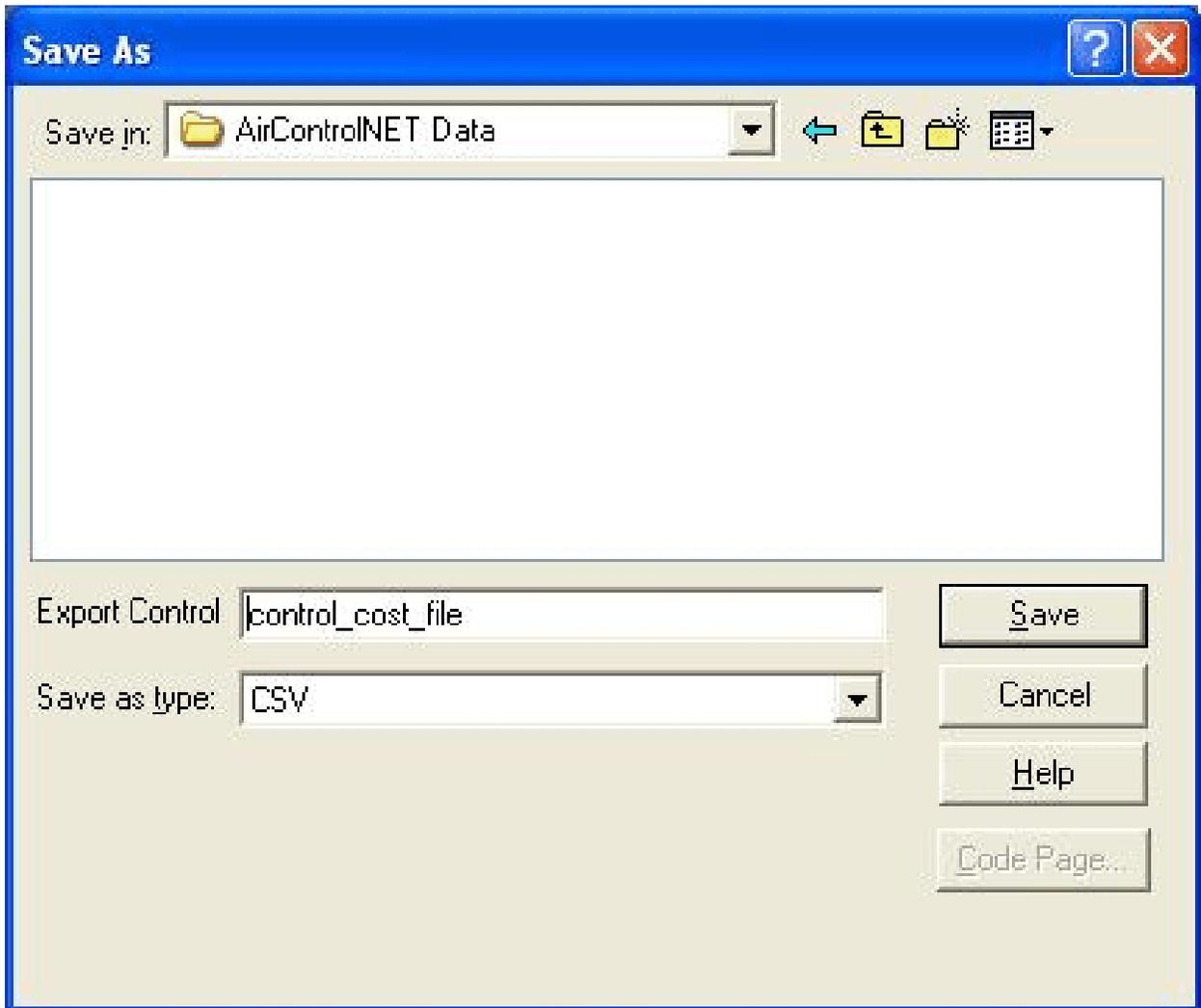
- ! Control Cost File. You can export the total annual costs of your control strategy into a spreadsheet file for use in economic impact models (e.g., ISEG's EMPAX-CGE model). You simply select Control Cost File under Export from the interface toolbar menu. The Control Cost File "Save As" Dialog box will appear as shown in Figure III-14. The default path will be the AirControlNET directory folder. You can define the Control Cost file name and then save by clicking the Save button. The control cost file will then be created and available for further analysis.

2. Reporting Data from a Control Scenario

By selecting Report under File from the interface toolbar menu, you can report the following types of pre-formatted templates reflecting the control scenario for use in subsequent analysis and/or presentation:

- ! Emissions Summary. You can produce an emissions summary report using state, county, MSA, pollutant, sector, NAICS, cost per ton, and max control filters. The report includes number of records, measure name, affected source, emissions before control, incremental reductions, emissions after control, percent reduction and cumulative emissions data. This report can be printed from this screen or exported as an Excel (*.XLS), database (*.DBF) or comma delimited file (*.CSV). Please note that Excel files are limited to 16,383 records.
- ! Cost Summary. You can produce a cost summary report using state, county, MSA, pollutant, sector, NAICS, cost per ton, and max control filters. The report includes number of records, measure name, affected source, total cost, cost per ton and cumulative cost data. This report can be printed from this screen or exported as an Excel (*.XLS), database (*.DBF) or comma delimited file (*.CSV). A more detailed description of these files with screen shots is provided in Appendix D "Exporting and Reporting Files."

Figure III-14. Control Cost File Save As Dialog Box



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CHAPTER IV. LEAST-COST MODULE

The Least-Cost Module provides the capability to create the least-cost set of control measures that achieves a specified emission reduction target as part of a control strategies and costing analysis. The interface for this module, as presented in Figure IV-1, provides a query-based tool to determine the set of control measures that will meet the emissions reduction target as specified in terms of absolute tons or as a percentage. This module facilitates such queries through pre-set filters that allow you to define criteria for selection of control measures and then create the resulting data set. This chapter begins by introducing the interface for the Least-Cost Module and provides details on the available data query options. Examples are provided to better illustrate these capabilities. The chapter concludes by presenting the options for exporting data and reporting the query results.

Total Controllable Tons:

In least-cost module, total controllable tons are defined as the sum of emissions from sources (i.e., plant/point/segment) that have been controlled within AirControlNET and selected for the specified query criteria.

For 1999 emissions inventory, nationwide total controllable tons for each pollutant by sector are listed in Table IV-1.

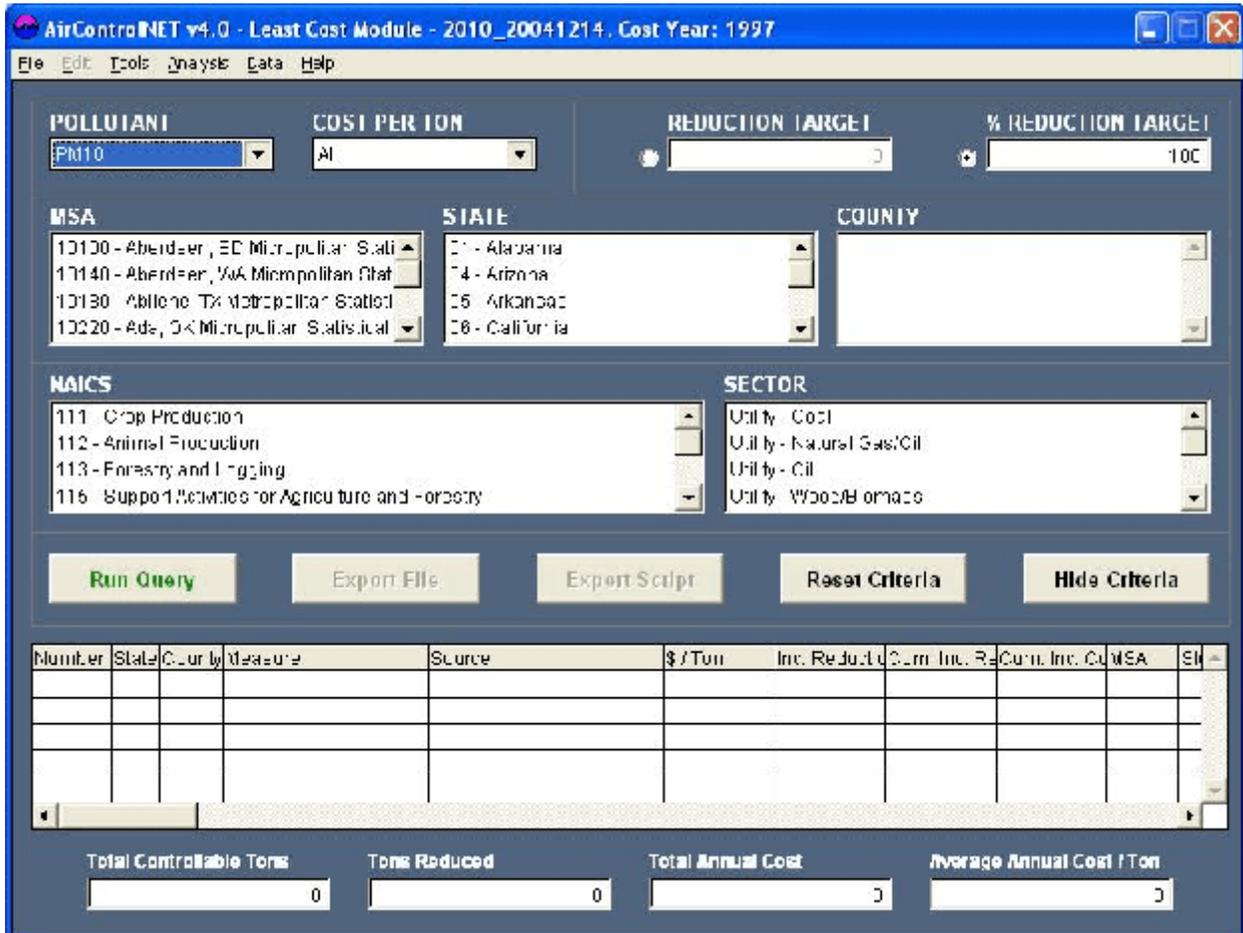
Table IV-1. 1999 Nationwide Emissions by Pollutant and Sector

Pollutant	Area		Onroad		Point	
	Uncontrolled Emissions	Controlled Emissions	Uncontrolled Emissions	Controlled Emissions	Uncontrolled Emissions	Controlled Emissions
VOC	10,812,750	5,459,791	5,564,026	5,564,026	2,061,167	99,820
NO _x	7,767,324	4,425,712	8,470,270	8,470,270	9,037,572	6,579,473
SO ₂	2,226,341	192,671	322,189	322,189	16,297,280	1,668,378
PM	5,869,957	4,557,568	188,328	188,328	673,288	310,873
NH ₃	4,507,679	3,518,580	265,533	265,533	195,345	0

Consider following filtering criteria as an example for LCM module query:

State: North Carolina (37)
 County: Chatham Co. (37037)
 Pollutant: NO_x
 Cost per ton: All
 Target Reductions: 100%
 Sector: All Point sources (i.e., EGUs and NEGUs)
 Cost Year: 1997
 Inventory year: 1999

Figure IV-1. Least-Cost Module Interface



Following control summary results are obtained for the query.

Total Controllable Tons = 5,420 tons

Tons Reduced = 4,870 tons

When Percentage Reduction target is defined to say 50 percent, target reduction is calculated to 50 percent of total available reductions (i.e., 4,870 tons). So reduction target in absolute tons would be 2,436 tons. Due to the discrete nature of control reductions, tons reduced would be equal to or greater than 2,436 tons. Actual reductions achieved for 50 percent target reduction are 2,847 tons.

The most stringent control applied to a source is the actual control for the source. The output results of Least Cost Module give maximum applicable controls for a source required to reach to specified reduction target on least cost basis. Most stringent controls for the sources selected by least cost query are highlighted in the database grid. Only maximum control applied to the source (i.e., plant/point/segment) is exported to the output file.

A. OVERVIEW OF LEAST-COST MODULE INTERFACE

Upon selecting this module from the AirControlNET Main Interface, you are presented with the Least-Cost Module Interface as shown in Figure IV-1. There are five important components of this interface that you must be familiar with in order to create least-cost control scenarios, i.e., *Filtering Criteria*, *Reduction Targets*, *User Commands*, *Database Grid*, and *Control Summary*.

Filtering Criteria: The Filtering Criteria section allows you to define the set of control measures to be included as part of the least-cost control strategy scenario. Based on your selections across the wide range of filtering criteria, these least-cost control measures are displayed in the Database Grid. The wide range of drop down combo boxes gives you the ability to filter the database according to your specific requirements. Once the desired combination of criteria has been selected, you can specify the emission reduction targets (in either absolute tons or percentage) and then apply the User Commands as described below to obtain the matching set of control measures to be displayed within the Database Grid.

Reduction Targets: The Reduction Targets section allows you to define an emissions reduction target in terms of absolute tons or as a percentage so that this module can then determine the least-cost set of control strategies based on the selected filtering criteria. A percentage reduction target is translated into absolute tons using available reduction tons. Please note that due to the incremental nature of the calculations, the actual reduction amounts (either percentage or absolute tons) are greater than the desired reduction target. The actual amount reduced is displayed in the Tons Reduced Summary Field.

User Commands: The User Commands section of the interface provides different query options to facilitate creating control scenarios. After you have chosen the conditions for which the scenario is being created, the Run Query command executes the selected filters and displays the least-cost set of control measures matching those criteria in the Database Grid (described below).

The Export File and Export Script command button allow you to export the results shown in the Database Grid to a REMSAD-ST script (as described in section C). The Reset Criteria command button allows you to reset the control measures displayed in the Database Grid and begin a new filtering and/or selection process. The Hide Criteria command button allows you to hide the filtering criteria fields to gain a better view of the Database Grid. This button converts to Show Criteria once the Database Grid is expanded.

Database Grid: The Database Grid displays the set of least-cost control measures that are obtained from the AirControlNET database (Please see the AirControlNET Development report for details on the development of this database). Each row entry displayed in this grid represents an individual control measure as applied to a particular source. You may experience some delays when updating this grid due to the large database being accessed. Based on the filter criteria that you select for a data query, this grid area will display those control measures that match the selected criteria. The individual fields contained within this grid are listed and defined in Appendix B.

Control Summary: The Control Summary section provides you with useful summary or aggregate calculations based on the least-cost set of control measures that are displayed within the Database Grid. These summary results should help you confirm that your specified target was met and the associated total costs and costs per ton reduced. This summary information is updated for each new query.

1. Filtering Criteria Fields

These fields are shown in Figure IV-1 across the top of the Least-Cost Module interface and provide the various criteria for you to select through drop-down menus. Applying these filters will query the database and results in the Database Grid displaying the least cost set of control measures that match the selected criteria. Multiple selections can be made from the MSA, State, County, NAICS and Sector fields by holding down the CTRL key.

Pollutant—This field lists the available pollutants including PM₁₀, PM_{2.5}, EC, OC, NO_x, SO₂, VOC, NH₃, CO, and Hg.

Cost Per Ton—This field provides a list of threshold criteria for the cost per ton of pollutant emissions reduced that range from less than \$5,000 per ton to less than \$20,000 per ton. Cost refers to the total annual cost of the subject control measure.

MSA—This field lists the Metropolitan Statistical Areas (MSAs). The MSA field also includes micropolitan and consolidated areas. Further information concerning MSA definitions can be obtained from the U.S. Census Bureau website at:

<http://www.census.gov/population/www/estimates/metroarea.html>

State—This field lists all 50 US States and the District of Columbia. If an MSA is selected, then only those States in that area will be listed.

County–This field lists all U.S. Counties. If a State or MSA is selected, then only those counties in that area will be available through the menu box.

NAICS–This field lists 3-digit North American Industry Classification System (NAICS) codes that identify broad industrial sectors across the United States. NAICS definitions (2002 Revisions) can be accessed from the U.S. Census Bureau website at <http://www.census.gov/epcd/naics02>.

Sector–This field lists broad Sectors of emission sources including Utilities (by fuel), Nonutility (by fuel), Area, Onroad mobile (by gas or diesel), and Nonroad (by gas or diesel). Please note that not all Sectors have available control measures.

Please note that these filtering criteria fields are not mutually exclusive so that not all fields may be used in conjunction with each other as shown in Figure IV-2.

Figure IV-2. Possible Combinations of Filtering Criteria Fields: Least-Cost Module 2. User Commands

	State	County	MSA	NAICS	Sector	Cost Per Ton
State
County
MSA	
NAICS
Sector
Cost Per Ton

As shown in Figure IV-1, the following command buttons are provided just below the Filtering Criteria area and allow you to apply the specified filters in querying the database and creating a least-cost control strategies scenario.

Run Query–This command queries the database and then displays in the Database Grid all of those control measures that match the criteria combination selected in the Filtering Criteria section.

Export File–This command allows you to save the least-cost set of control measures displayed in the Database Grid to a range of file formats, namely Dbase (*.DBF), Excel spreadsheet (*.XLS), or text file (*.TXT). Please note that certain file types are limited in size, i.e. Excel files can only accommodate 16,383 rows of data.

Export Script–This command allows you to save the emission reductions information associated with your least-cost control scenario into a control factors file, or input script, for the REMSAD-ST air quality model.

Reset Criteria—This command allows you to return the Least Cost Module interface to the initial start-up state. That is, all filtering criteria fields are returned to defaults so that a new data query can be performed.

Hide Criteria—This command allows you to move the filtering selection criteria out of view and expand the Database Grid to display more area and show the results of the database query. This should facilitate your review of the least-cost control measures. You can select the “Show Criteria” command located at the top right-hand side of the screen to return to the original screen.

3. Control Summary Fields

As shown in Figure IV-1, each of the following fields are shown across the bottom of the Least Cost Module interface based on the least-cost set of control measures shown in the Database Grid.

Total Controllable Tons—This field provides the sum of the emissions for which controls are applicable (i.e., controllable emissions rather than total emissions).

Tons Reduced—This field provides the sum of the emissions reduced in absolute terms (tons) for the selected emission control measures. Please note that this value is larger (or equal to) the Reduction Target (in tons).

Total Cost—This field provides the sum of the Total Cost values across all of the selected emission control measures.

Average Cost Per Ton—This field provides the average cost per ton that is equal to the Total Cost value divided by the Tons Reduced.

B. DEVELOPING A LEAST-COST CONTROL SCENARIO

This section provides step-by-step instructions on how to create a least-cost control scenario using this module. An example (using the NEI 2010 emissions data and the 1997 cost year) is provided throughout these instructions to assist you with this application in tutorial fashion. In summary, the process begins by selecting the pollutant of interest, entering the desired reduction target (by absolute tons or percentage), and then applying the filtering criteria to query the control measures database that will display the control measures of interest within the Database Grid. You can then save and export the resulting database. The Control Scenarios Module interface facilitates and simplifies this process for you as detailed in the remainder of this section.

The following generic steps illustrate how to create a least-cost control scenario within the Least-Cost Module:

Step 1: Select a pollutant and enter reduction target.

You begin the process of creating a least-cost scenario by first selecting the pollutant of interest (i.e., PM₁₀, PM_{2.5}, EC, OC, NO_x, SO₂, VOC, NH₃, CO, or Hg) and then enter your desired reduction target in one of the following ways:

Absolute ton reduction: In this case, you enter a reduction target in terms of number of tons that you desire to be controlled based on the available control measures within AirControlNET. This tonnage estimate should be entered in the top right-hand portion of the interface as shown in Figure IV-3. The example here shows a 100,000 ton reduction target for PM₁₀.

Percentage reduction: In this case, you enter a reduction target in terms of percent reduction from baseline emissions levels to be achieved based on the available control measures within AirControlNET. This percentage should be entered in the top right-hand portion of the interface as shown in Figure IV-4. The example here shows a 65% reduction target for PM₁₀.

Please note that the calculations performed in this module are incremental by lowest cost, causing the actual Tons Reduced to overshoot the desired Reduction Target. The actual reduction amount is displayed in the Tons Reduced summary field. The interface facilitates the entry of these inputs and then focuses you on selection of filtering criteria to define the region and sectors as the next step in creating your least-cost scenario.

Step 2: Apply filtering criteria to define query of control measures database.

This step involves applying the appropriate filtering criteria to select the regional and sectoral applicability of the emissions reduction target in determining the individual control measures that match the criteria of interest. The interface facilitates these selections so that defining the query is a simple process involving your selection of the desired filtering criteria from the drop-down menus. Please note, as shown in Figure IV-2, the filtering criteria fields are not all mutually exclusive. As shown in Figures IV-3 and IV-4, the following criteria were selected for determining the least-cost control scenario for both the absolute tons (Figure IV-3) and percentage (Figure IV-4) reduction targets (as specified in Step 1 above):

Cost Per Ton = All (default)
State = Alabama, Arizona

It is important to note that you can select multiple entries within a filtering criteria field, say MSA, by holding down the CTRL button while selecting the entries that you want to include. In the example above, you must individually select each MSA of interest, i.e., those with counties in Alabama or Arizona. Multiple selections can be made from the State, County, NAICS, and Sector fields.

Step 3: Select Run Query command to initiate query of control measures database.

Note: The results of this query will be displayed on the screen, sorted based on the values displayed on the \$/ton column.

Figure IV-3. Least-Cost Scenario Resulting From an Absolute Ton Reduction Target: Show Criteria

AirControlNET v4.0 - Least Cost Module - 2010_20041214 - Cost Year: 1997

File Edit Tools Analyse Data Help

POLLUTANT: PM10 **COST PER TON:** Al **REDUCTION TARGET:** 10,000 **% REDUCTION TARGET:** 65

MSA: 10100 - Aberdeen, MD Metropolitan Statistical Area
 10140 - Aberdeen, WA Metropolitan Statistical Area
 10180 - Abilene, TX Metropolitan Statistical Area
 10220 - Ada, OK Metropolitan Statistical Area

STATE: 01 - Alabama
 04 - Arizona
 05 - Arkansas
 06 - California

COUNTY: 01001 - Alameda Co
 01003 - Baldwin Co
 01005 - Barber Co
 01007 - Bibb Co

NAICS: 111 - Crop Production
 112 - Animal Production
 113 - Forestry and Logging
 115 - Support Activities for Agriculture and Forestry

SECTOR: Utility - Coal
 Utility - Natural Gas/Oil
 Utility - Oil
 Utility - Wood/Biomass

Run Query Export File Export Script Reset Criteria Hide Criteria

Number	State	County	Measure	Source	\$/Ton	Inc. Reduction	Cum. Inc. Red.	Cum. Inc. Cost	MSA	SI
1	01	C77	Fabric Filter (Pulse Jet Type)	Mineral Products - Other	112	10.7	10.7	1,540	22400	
2	01	L03	Fabric Filter (Pulse Jet Type)	Mineral Products - Other	112	14.3	31.1	3,195	10412	
3	04	C03	Fabric Filter (Pulse Jet Type)	Mineral Products - Other	112	35.4	64.5	7,232	45420	
4	01	C70	Enhanced Monitoring Program	Mineral Products - Other	115	0.9	60.4	7,041	10021	
5	01	L15	Soil Conservation Plans	Agriculture - Tillage	150	3.9	66.2	7,866	11600	

Total Controllable Tons: 13,691 **Tons Reduced:** 10,053 **Total Annual Cost:** 78,890,483 **Average Annual Cost / Ton:** 783

**Figure IV-4. Least-Cost Scenario Resulting From a Percentage Reduction Target:
Show Criteria**

AirControlNET v4.0 - Least Cost Module - 2010_20041214, Cost Year: 1997

File Edit Tools Analyse Data Help

POLLUTANT: PM10 **COST PER TON:** Al **REDUCTION TARGET:** **% REDUCTION TARGET:** 6%

MSA: 10100 - Aberdeen, MD Metropolitan Statistical Area
10140 - Aberdeen, WA Metropolitan Statistical Area
10180 - Abilene, TX Metropolitan Statistical Area
10220 - Ada, OK Metropolitan Statistical Area

STATE: 01 - Alabama
04 - Arizona
05 - Arkansas
06 - California

COUNTY: 01001 - Autauga Co
01003 - Baldwin Co
01005 - Barber Co
01007 - Bibb Co

NAICS: 111 - Crop Production
112 - Animal Production
113 - Forestry and Logging
115 - Support Activities for Agriculture and Forestry

SECTOR: Utility - Coal
Utility - Natural Gas/Oil
Utility - Oil
Utility - Wood/W Biomass

Run Query Export File Export Script Reset Criteria Hide Criteria

Number	State	County	Measure	Source	\$/Ton	Inc. Reduct	Cum. Inc. Reduct	Inc. Co	MSA	SI

Total Controllable Tons: **Tons Reduced:** **Total Annual Cost:** **Average Annual Cost / Ton:**

You initiate the query of the control measures database by selecting the Run Query command. The least-cost set of control measures that achieve your emission reduction target will then be displayed within the Database Grid. Figures IV-5 and IV-6 show, for the example queries from Steps 1 and 2 above, the least-cost set of control measures as within the Database Grid. The resulting Database Grid shown in Figure IV-3 includes the records that achieve the absolute ton reduction target, while Figure IV-6 includes the records that achieve the percentage reduction target. The resulting control measures are given a record number based on their sorting according to the \$/Ton column so that the most cost-effective control is listed first (e.g., lowest \$/ton) and the last control displayed reflects the highest \$/ton necessary to meet your stated target. Selecting Hide Criteria will allow for a better view of the as shown in Panel (b) of each figure and selecting Show Criteria will from that view will return the screen to the original view as shown in Panel a of each figure.

Step 4: Export results into measures file, REMSAD script, or cost file.

Once your least-cost scenario is defined, then you can export the Measure File and REMSAD Script directly by using the Export File or Export Script user command buttons. You can also refer forward to Section C “Exporting and Reporting” to provide the above export files as well as a Control Cost File and for gaining an emissions or cost summary report associated with your least-cost scenario.

C. EXPORTING AND REPORTING

This section provides instructions on exporting and reporting the results of your least-cost control strategies scenario. Please note that you can also export the Measure File and REMSAD Script directly by using the Export File or Export Script user command buttons.

1. Exporting Data from a Least-Cost Control Scenario

By selecting Export under File from the interface toolbar menu, you can export the following types of data files reflecting the control scenario for use in subsequent analysis:

! **Measure File.** You can export the current scenario displayed in the Database Grid to a range of file formats, namely Dbase (*.DBF), Excel spreadsheet (*.XLS), or text file (*.TXT). You can simply select Measure File after selecting Export under File from the interface toolbar menu. The Measure File “Save As” Dialog box will appear as shown in Figure IV-6. The default path will be the AirControlNET directory folder and you may then define the measure file name and then save by clicking the Save button. The measure file will then be created and available for further analysis. Please note that Excel files are limited to 16,383 records.

Figure IV-5. Least-Cost Scenario Resulting From an Absolute Ton Reduction Target

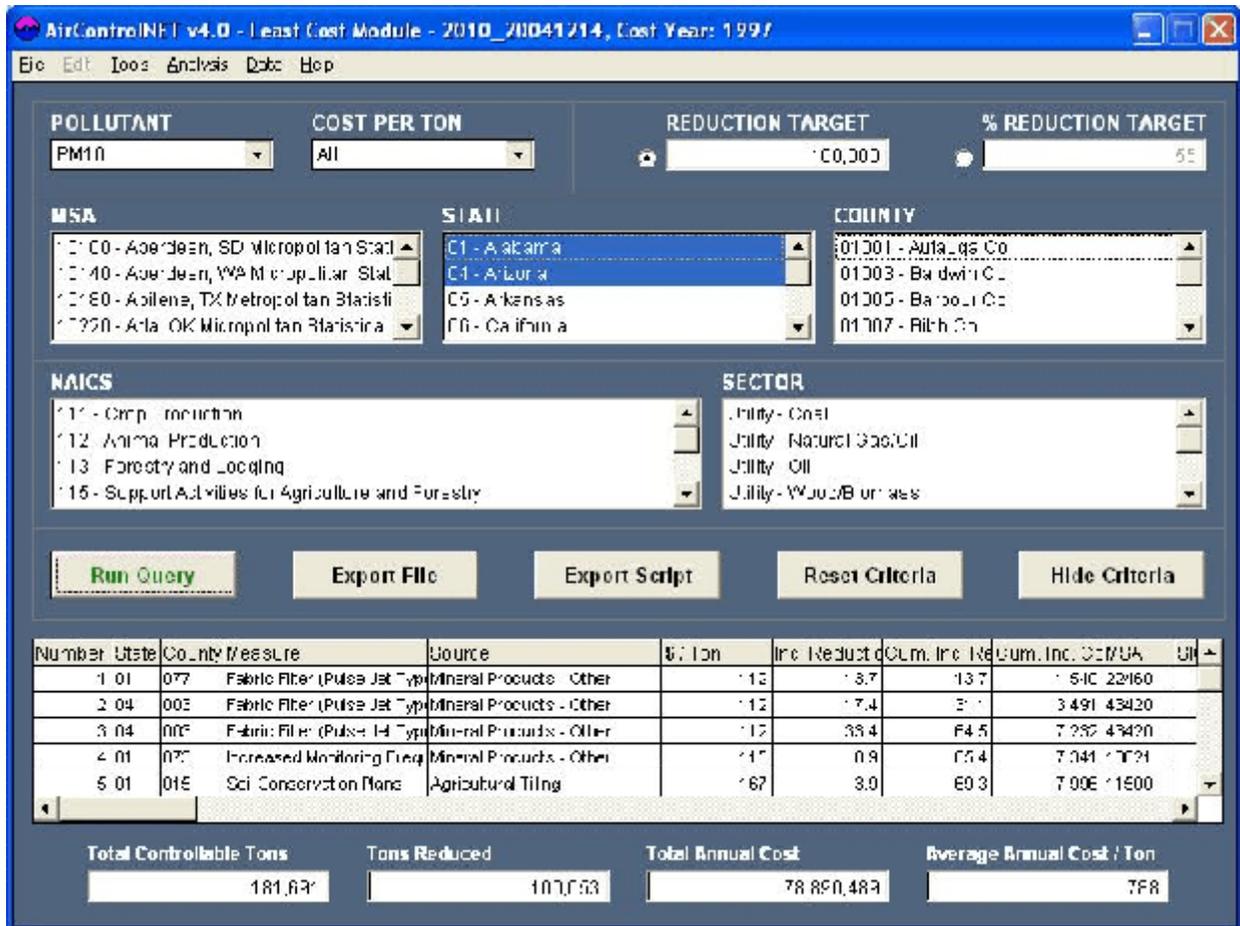
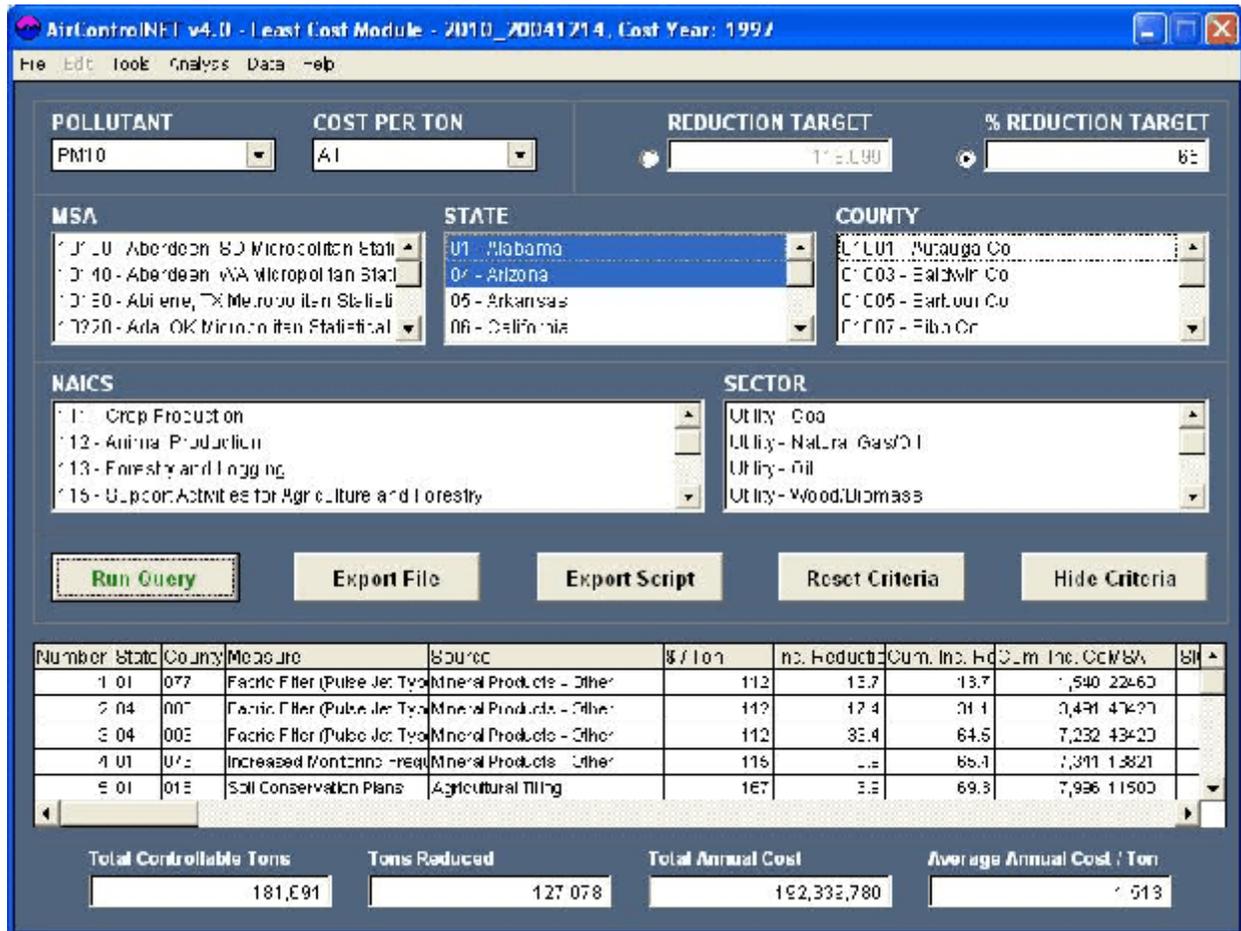


Figure IV-6. Least-Cost Scenario Resulting From an Percentage Reduction Target



- ! **REMSAD-ST Script File.** Export the emission reductions information into a control factors file, or input script, for the REMSAD-ST air quality model. You can simply select REMSAD-ST Script under Export from the interface toolbar menu. The REMSAD-ST Script “Save As” Dialog box will appear as shown in Figure IV-7. The default path will be the AirControlNET directory folder and you may then define the REMSAD-ST input script file name and then save by clicking the Save button. This file must be saved as a text file (*.TXT). You will be prompted separately to provide "user name" and "scenario description" for documentation purposes (more details with screen shots are available in Chapter V). This file will then be created and available for use in the REMSAD-ST air quality model.

- ! **Control Cost File.** You can export the total annual costs of your control strategy into a spreadsheet file for use in economic impact models (e.g., ISEG’s EMPAX-CGE model). You simply select Control Cost File under Export from the interface toolbar menu. The Control Cost File “Save As” Dialog box will appear as shown in Figure IV-8. The default path will be the AirControlNET directory folder. You can define the Control Cost file name and then save by clicking the Save button. The control cost file will then be created and available for further analysis.

2. Reporting Data from a Least-Cost Control Scenario

By selecting Report under File from the interface toolbar menu, you can report the following types of pre-formatted templates reflecting the least-cost scenario for use in subsequent analysis and/or presentation:

- ! **Emissions Summary.** You can produce an emissions summary report using state, county, MSA, pollutant, sector, NAICS, cost per ton, and max control filters. The report includes number of records, measure name, affected source, emissions before control, incremental reductions, emissions after control, percent reduction and cumulative emissions data. This report can be printed from this screen or exported as an Excel (*.XLS), database (*.DBF) or comma delimited file (*.CSV). Please note that Excel files are limited to 16,383 records.

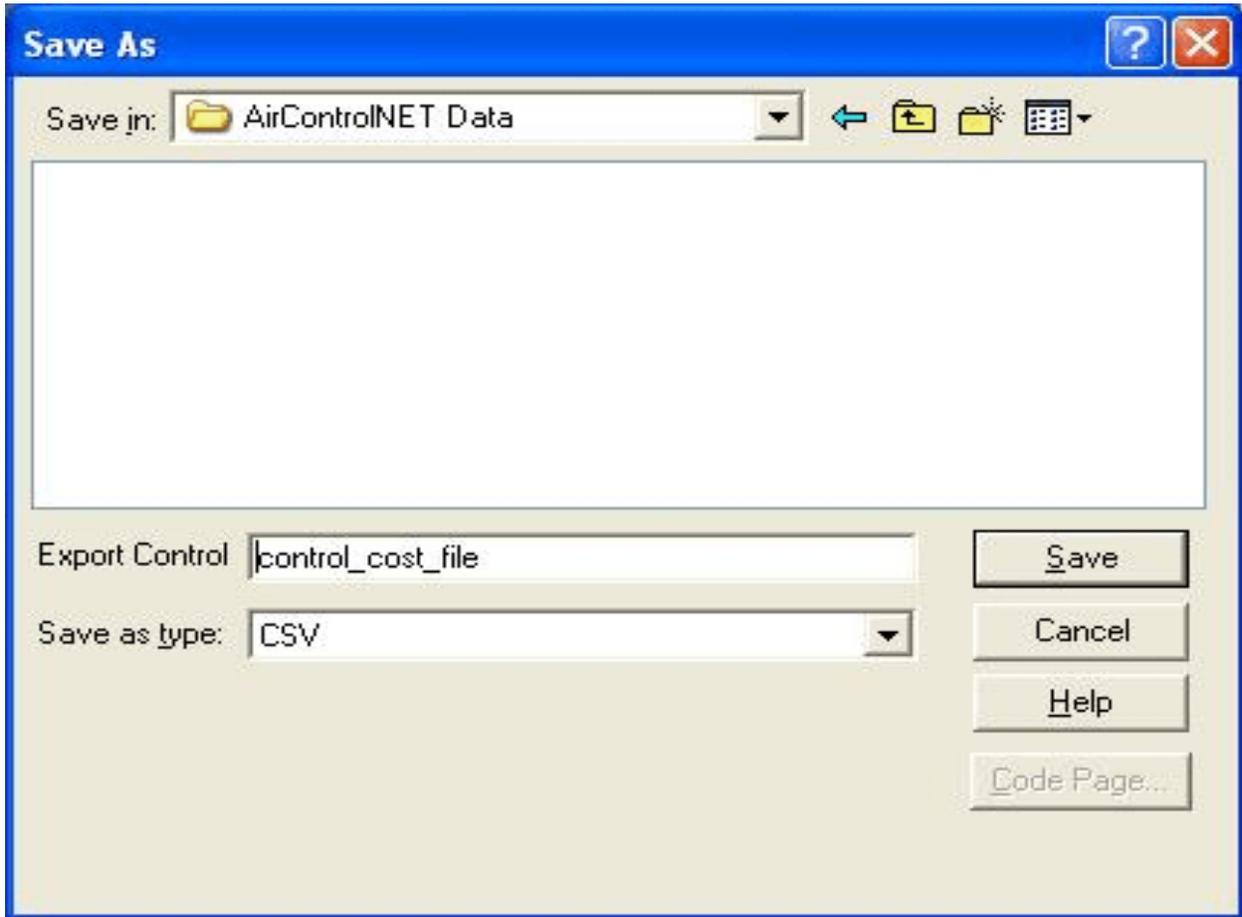
- ! **Cost Summary.** You can produce a cost summary report using state, county, MSA, pollutant, sector, NAICS, cost per ton, and max control filters. The report includes number of records, measure name, affected source, total cost, cost per ton and cumulative cost data. This report can be printed from this screen or exported as an Excel (*.XLS), database (*.DBF) or comma delimited file (*.CSV). Please note that Excel files are limited to 16,383 records.

A more detailed description of these files with screen shots is provided in Appendix D “Exporting and Reporting Files.”

Figure IV-7. REMSAD-ST Script Save As Dialog Box



Figure IV-8. Control Cost File Save As Dialog Box



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CHAPTER V. SCRIPT BUILDER MODULE

The REMSAD-ST Script Builder Module provides the capability to develop emission control scenarios for execution in the REMSAD-ST air quality model. The interface for this module, as presented in Figure V-1, provides a quick and easy way to build text files reflecting emission reduction strategies that can be exported as a REMSAD-ST input script. The emission reductions are defined by pollutant control factors. This module facilitates the script development process through pre-set filters that allow you to define criteria for application of the specified pollutant reductions and then create the resulting input script for REMSAD-ST. This chapter introduces you to the Script Builder Module interface and provides details on the available options. Examples are provided to better illustrate these capabilities.

A. OVERVIEW OF SCRIPT BUILDER MODULE INTERFACE

Upon selecting this module from the AirControlNET Main Interface, you are presented with the Script Builder Module Interface as shown in Figure V-1. There are four important components of this interface that you must be familiar with in order to create your control scenarios, i.e., *Filtering Criteria*, *Pollutant Control Factors*, *User Commands*, and *Display Grid*.

Filtering Criteria: The Filtering Criteria section allows you to define individual control scenarios to be included as part of the REMSAD-ST script. You can select from a wide range of filtering criteria through drop down combo boxes that help you design the script according to your specific requirements. Once you have selected the desired combination of filtering criteria, you can specify the pollutant control factors for each pollutant of interest and then apply the User Commands as described below to develop a control scenario to be shown in the Display Grid.

Pollutant Control Factors: The Pollutant Control Factors section allows you to provide scaling factors to adjust the pollutant emissions in the REMSAD-ST baseline emission inventory for the various pollutants shown in Figure V-1. For example, a control factor of 0.80 is equivalent to a 20 percent emission reduction (i.e., 80 percent of the emissions remain). Pollutant control factors are available for NO_x, VOC, CO, SO_x, NH₃, SOA, PM₁₀ (coarse and fine particulate matter), PMC (coarse fraction particulate matter), and PM_{2.5} (fine fraction particulate matter).

User Commands: The User Commands section of the interface facilitates the development of your REMSAD-ST script. After you have chosen the filtering criteria and pollutant control factors, the Add command executes your selections and displays a new control scenario, i.e., row entry, within the Display Grid (as described below). The Remove Selected command button allows you to delete a control scenario, or row entry, that is no longer desired by removing any row entry that has its checkbox unselected. The Export Script command button allows you to export the results shown in the Display Grid to a REMSAD-ST script, while the Reset Criteria command allows you to reset the filtering criteria and begin a new filtering and/or selection process.

Display Grid: The Display Grid shows the set of individual control scenarios that have been added by the user. Based on the filter criteria that you select for a data query, this grid area will display those control measures that match the selected criteria. Each row entry displayed in this grid represents an individual control scenario with the final script file comprising a single row or multiple rows. The individual fields contained within this grid are listed and defined in Appendix C.

1. Filtering Criteria Fields

These fields are shown in Figure V-1 across the top of the Script Builder Module interface and provide the various criteria for you to select through drop-down menus. Applying these filters will define the input script with results shown in the Display Grid based on the selected criteria.

Region—This field lists a range of broad regions that are typical of regulatory and policy analysis including:

- ! Eastern and Western continental United States. Eastern States are defined as the 37 OTAG States, defined as all states east of or touching the 100° line of longitude.
- ! The Ozone Transport Commission (OTC) <http://www.sso.org/otc/main/about.htm>
- ! Southern Appalachian Mountain Initiative (SAMI) <http://www.saminet.org>, and
- ! Regional Planning Organizations (RPOs) such as WRAP, WESTAR, LADCO, NESCAUM, MARAMA, CENSARA, and SESARM <http://www.epa.gov/air/visibility/regional.html>)

MSA—This field lists the Metropolitan Statistical Areas (MSAs). The MSA field also includes micropolitan and consolidated areas. Further information on MSA definitions can be obtained from the U.S. Census Bureau website at: <http://www.census.gov/population/www/estimates/metroarea.html>

State—This field lists all 50 US States and the District of Columbia. If a Region or MSA is selected, then only those States in that area will be listed.

County—This field lists all U.S. Counties. If a Region, State or MSA is selected, then only those counties in that area will be available through the menu box.

SIC—This field lists 2-digit Standard Industrial Classification (SIC) codes that identify broad industrial sectors across the United States. SIC look-up tables can be obtained from the U.S. Census Bureau at <http://www.census.gov/epcd/www/naicstab.htm>

Sector—This field lists broad Sectors of emission sources including Utilities (by fuel), Nonutility (by fuel), Area, Onroad mobile (by gas or diesel), and Nonroad (by gas or diesel). Please note that not all Sectors have available control measures.

SCC—This field lists 8-digit Source Classification Codes (SCC). If a Sector is selected, then only SCCs that correspond to that Sector will be displayed.

Facility ID—This field allows you to enter a facility ID code that identifies a specific plant in the NEI inventory. The facility ID is the plant ID from the NEI inventory. This field only applies to point non-EGU and EGU sources.

Please note that these filtering criteria fields are not mutually exclusive so that not all fields may be used in conjunction with each other as shown in Figure V-2.

Figure V-2. Possible Combinations of Filtering Criteria Fields: Script Builder Module

	State	County	MSA	Region	SIC	NAICS	Sector	SCC	Facility ID
State	<input type="checkbox"/>								
County	<input type="checkbox"/>								
MSA	<input type="checkbox"/>								
Region	<input type="checkbox"/>								
SIC	<input type="checkbox"/>								
NAICS	<input type="checkbox"/>								
Sector	<input type="checkbox"/>								
SCC	<input type="checkbox"/>								
Facility ID	<input type="checkbox"/>								

2. User Commands

As shown in Figure V-1, the following command buttons are provided just below the Filtering Criteria area and allow you to apply the specified filters in creating control scenarios as part of the REMSAD-ST script file.

Add—This command adds the current combination of Filtering Criteria selections and Pollutant Control Factors to the grid for inclusion in a REMSAD-ST input script.

Remove Unselected—This command removes all row entries, or control scenarios, from the grid that do not have their checkbox selected.

Export Script—This command allows you to export the control information shown in the Display Grid that have been selected into a REMSAD-ST air quality model.

Reset Criteria—This command allows the user to return the Script Builder Module interface to the initial start-up state. That is, all filtering criteria fields are returned to default “All” values, all pollutant reduction ratios are returned to 1.00, and the Display Grid is cleared to contain no row entries.

B. DEVELOPING A REMSAD-ST SCRIPT

This section provides step-by-step instructions on how to create a REMSAD-ST script reflecting a control scenario using this module. An example is provided throughout these instructions to assist you with this application in tutorial fashion. In summary, the process begins by applying the filtering criteria to query the control measures database and then selecting the level of control via the pollutant control factors. The resulting control scenario will be shown within the Display Grid for inclusion in the script. You can then export this script file or repeat this process multiple times to accumulate all of the control scenarios to be part of the overall control strategy scenario. The Script Builder Module interface facilitates and simplifies this process for you as detailed in the remainder of this section.

The following generic steps illustrate how to create a REMSAD-ST script within the Script Builder Module:

Step 1: Apply Filtering Criteria to define applicability of controls.

You begin the process of creating a script file by applying the appropriate filtering criteria to determine the regional and sectoral applicability for your control scenario. The interface facilitates these selections so that defining the query is a simple process involving your selection of the desired filtering criteria from the drop-down menus. Figure V-3 shows the example where the following filtering criteria were selected as part of this script development process:

Region = Eastern United States
Sector = Coal-fired Electric Utilities

Step 2: Enter Pollutant Control Factors

This step involves entering the desired control factors across all pollutants of interest to complete the process of defining the individual control scenario to be part of the REMSAD-ST script file. Figure V-4 shows the example where the following pollutant control factors were entered as applied to the filtering criteria selected in Step 1 above:

$\text{NO}_x = 0.60$
VOC = 1.00 (unchanged)
CO = 1.00 (unchanged)
 $\text{SO}_x = 1.00$ (unchanged)
 $\text{NH}_3 = 1.00$ (unchanged)
SOA = 1.00 (unchanged)
 $\text{PM}_{10} = 1.00$ (unchanged)

PMC = 1.00 (unchanged)

PM_{2.5} = 1.00 (unchanged)

Figure V-3. Selection of Filtering Criteria within Script Builder Module

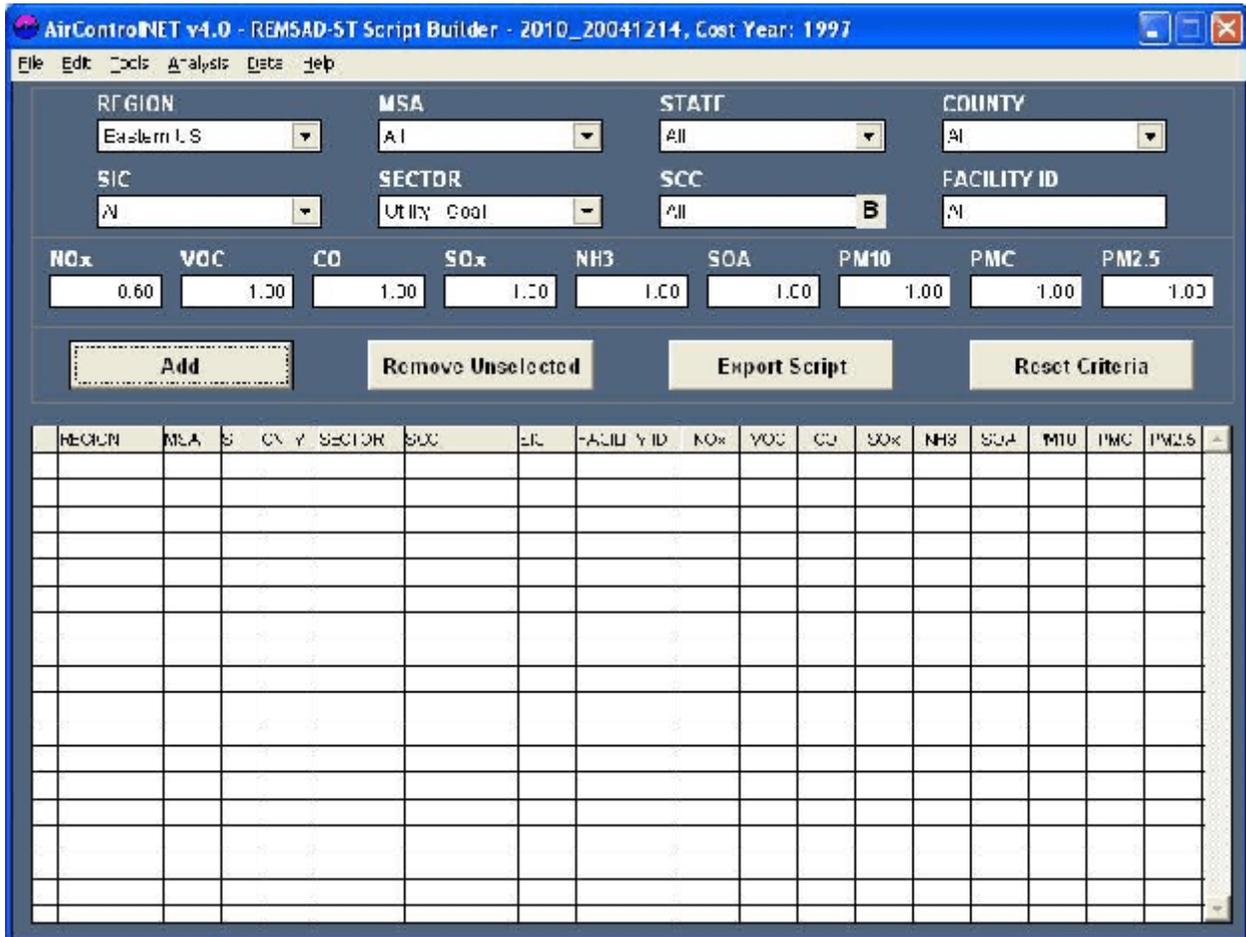


Figure V-4. Entering Pollutant Control Factors

The screenshot shows the 'AirControlNET v4.0 - REMSAD-ST Script Builder' window. The title bar includes the file name '2010_20041214' and 'Cost Year: 1997'. The menu bar contains 'File', 'Edit', 'Tools', 'Analysis', 'Data', and 'Help'. The main interface is divided into several sections:

- Filter Selection:** REGION (Eastern US), MSA (All), STATE (All), COUNTY (All), SIC (All), SECTOR (Utility-Cool), SCC (All), FACILITY ID (All).
- Pollutant Control Factors:** NOx (0.30), VOC (1.00), CO (1.00), SOx (1.00), NH3 (1.00), SOA (1.00), PM10 (1.00), PMC (1.00), PM2.5 (1.00).
- Buttons:** Add, Remove Unselected, Export Script, Reset Criteria.
- Data Table:** A table with columns for REGION, MSA, ST, CNTY, SECTOR, SCC, SIC, FACILITY ID, NOx, VOC, CO, SOx, NH3, SOA, PM10, PMC, and PM2.5. The first row is checked and contains the values: EAST, All, 00, 000, LT00, All, All, All, 0.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00.

Please recall that a control factor of 0.60 is equivalent of a 40 percent emission reduction (i.e., 60 percent of the emissions remain). So the above example will implement a 40 percent reduction of NO_x emissions from coal-fired electric utilities located in the eastern United States.

Step 3: Select Add command to include individual control scenario in Display Grid

You can now select the Add command to place the individual control scenario information into the Display Grid. This selection and resulting addition to the Display Grid are illustrated in Figure V-5. At this point, you may have completely defined your control strategy scenario by completing the 3 steps described thus far. If so, then you can refer forward to Step 5 “Export results into a REMSAD-ST script.” However, as noted previously, the creation of a REMSAD-ST script file can be a cumulative process in that additional control scenarios can be added to this initial specification. In this case, you can refer to the next step that describes combining multiple control specifications in creating the overall control strategy scenario.

Step 4: Continue Selection of Individual Control Scenario

To make additions to the overall scenario for your REMSAD-ST script, you must first select the *Reset Criteria* command that will eliminate previous filtering criteria and begin the process from Step 1 above. For our example, the filtering criteria have been reset and then the following filtering criteria were selected and pollutant control factors, as shown in Figure V-6(a), as part of an additional control scenario specification:

Region = Western United States
Sector = Coal-fired Electric Utilities

NO_x = 1.00 (unchanged)
VOC = 1.00 (unchanged)
CO = 1.00 (unchanged)
SO_x = 0.50
NH₃ = 1.00 (unchanged)
SOA = 1.00 (unchanged)
PM₁₀ = 1.00 (unchanged)
PMC = 1.00 (unchanged)
PM_{2.5} = 1.00 (unchanged)

So the above example will implement a 50 percent reduction of SO_x emissions from coal-fired electric utilities located in the western United States. The inclusion of this additional control scenario to the overall scenario is shown in Figure V-6(b).

This step may be repeated indefinitely until you have created your overall control strategy scenario. Once the scenario is completely defined, then you can refer forward to the next step of exporting the information to a script file.

Step 5: Export results into REMSAD-ST script

Once your individual selections completely define your overall control strategy scenario, then you can export the contents shown in the Display Grid into a REMSAD-ST Script directly by using the Export Script user command button. This will export the control scenario information for each row entry with its checkbox selected into a control factors file, or input script, for the REMSAD-ST air quality model. You can also export this information into a file by selecting Export under File from the interface toolbar menu. You simply select REMSAD-ST Script under Export from the interface toolbar menu.

Upon using either method, the REMSAD-ST Script "Save As" Dialog box will appear as shown in Figure V-7. The default path will be the AirControlNET directory folder. You can define the REMSAD-ST input script file name and then save by clicking the Save button. This file must be saved as a text file (*.TXT). You will be prompted separately to provide "user name" and "scenario description" for documentation purposes. This file will then be created and available for use in the REMSAD-ST air quality model. An example of the file resulting from our example is shown in Figure V-8.

Figure V-7. REMSAD-ST Script Save as Dialog Box

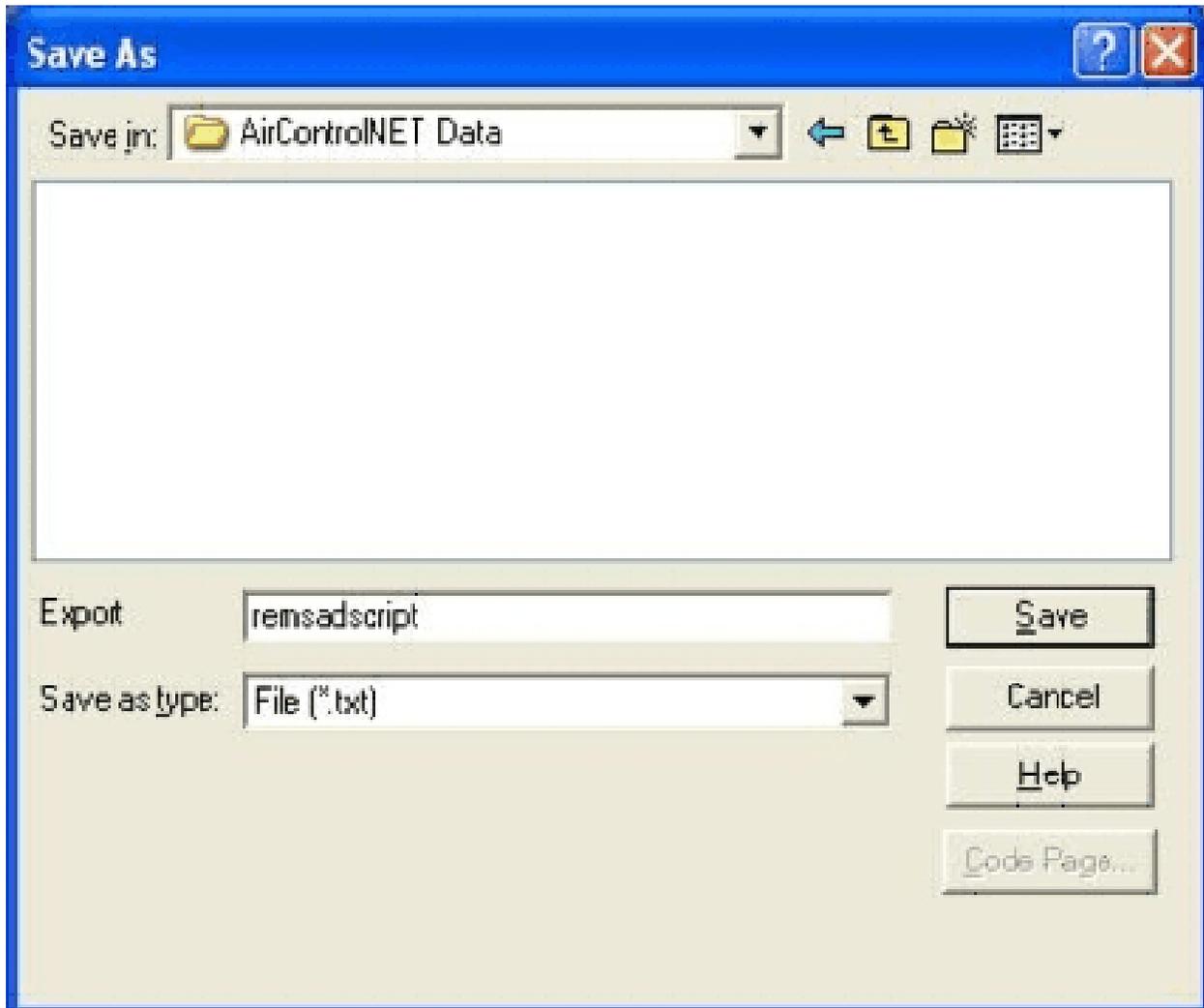


Figure V-8. Example REMSAD-ST Script

EVIDE	AEC	/SOURCE	CATEGORY/	NOX	VOC	CO	SOX	NH3	SOA	OMILO	OMC	OMO.S
22000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
48000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
47000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
23000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
45000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
46000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
50000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
21000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
19000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
02000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
55000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
31000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
51000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
20000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
24000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
44000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
28000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
37000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
36000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
29000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
33000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
34000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
38000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
27000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
42000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
25000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
40000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
26000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
01000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
39000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
18000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
34000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
35000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
13000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
15000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
04000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
49000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
16000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
41000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
12000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
09000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
53000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
11000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
06000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
10000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
56000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
17000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
32000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
05000	10100202			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00
08000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
20000	10100202			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
35000	10100203			1.00	1.00	1.00	0.50	1.00	1.00	1.00	1.00	1.00
39000	10100203			0.60	1.00	1.00	1.40	1.00	1.00	1.00	1.00	1.00

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CHAPTER VI. ANALYSIS TOOLS

AirControlNET provides two analysis tools: Maps and Graphs. The Map analysis tool is available when using the Control Scenario Module and the Least Cost Module. The graph analysis tool is only available when using the Least Cost Module.

A. MAP ANALYSIS TOOL

1. Overview of the AirControlNET Mapping Tool

When data is selected in the Control Scenarios Module or Least Cost Module, the map analysis tool becomes available as shown in Figure VI-1. This tool allows the creation of maps that shade States, counties, and MSAs based on pollutant emission reductions and costs.

When “Map” is selected from the analysis menu, a map creation window shown in Figure VI-2 is displayed. This window allows the user to set the map’s title, notes, font size, and static layers. There are also controls to set the dynamic layer shading ranges and colors. Each dynamic map feature, a state, county, or MSA, has ten dynamic shading ranges, one for each pollutant. The color shades and ranges can be automatically or manually set. The automatic ranges are determined by either a equal interval or Jenks Natural Breaks algorithm. The number of intervals is set by the check boxes to the left of the grid. The range colors can be set manually by clicking on the color to be changed and then using the color selector.

Once all map information has been set, the map can be viewed and/or saved. The map that is created is divided into two main sections which can be viewed by clicking the tabs in the upper left hand corner of the map. The default view is the map view shown in Figure VI-3. The second view displays notes that are associated with the map.

The map view is composed of two sections: the control panel and the map display. The control panel, located on the left side of the map window, contains the map thumbnail, the pollutant range selector and legend, and layer selector. The map thumbnail is used to zoom and pan the map. Zooming in and out is done by clicking the magnifying glasses marked with a plus and minus. To pan the map, the user can click and drag the map viewable area box, which is colored light blue. The drop down box indicates the pollutant range that is used to shade the dynamic state, county, and MSA layers. When a new pollutant is selected, the legend and map shading are automatically updated. The map layer selector is used to show and hide all of the map layers. The “Show More Layers” checkbox displays a window containing more static layers. The map display shows the map at the currently selected zoom level and panned area. The mouse can be used to query state, county, and MSA and display a window containing a pollutant histogram. The map can be exported to JPG at any time by clicking the “Export” button.

Figure VI-1. Selection Of Mapping Tool under Analysis Tab

Run Query **Export File** **Export Script** **Reset Criteria** **Hide Criteria**

Number	State	County	Measure	Source	\$/ton	Inc. Reduction	Cum. Inc. Red	Cum. Inc. Cost	MUA
1	01	077	Fabric Filter (Pulse Jet Type)	Minera Products - Other	112	13.7	13.7	1,540,22460	
2	04	000	Fabric Filter (Pulse Jet Type)	Minera Products - Other	112	17.4	31.1	3,491,40420	
3	01	003	Fabric Filter (Pulse Jet Type)	Minera Products - Other	112	33.4	61.5	7,232,73120	
4	01	073	Increase Milling Frequency	Minera Products - Other	115	0.9	65.4	7,341,13320	
5	01	015	Soil Conservation Plans	Agricultural Tilling	107	3.9	69.3	7,995,11500	

Total Controllable Tons **Tons Reduced** **Total Annual Cost** **Average Annual Cost / Ton**

181,891 181,891 3,034,752,421 16,702

Figure VI-2. Map Creation Window.

Map Title
Annual Emissions Reduction (tons/year)

Font Size
12

Map Notes
2010 Annual Emission Reductions with static class1, highway, and railroad layers.

Additional Layers

- Tribes
- National Parks
- Class1 Tribes
- Class1 NPS
- Class1 FS
- Class1 FWS
- Major Highways
- Railroads
- Rivers
- Lakes

Pollutant
PM10

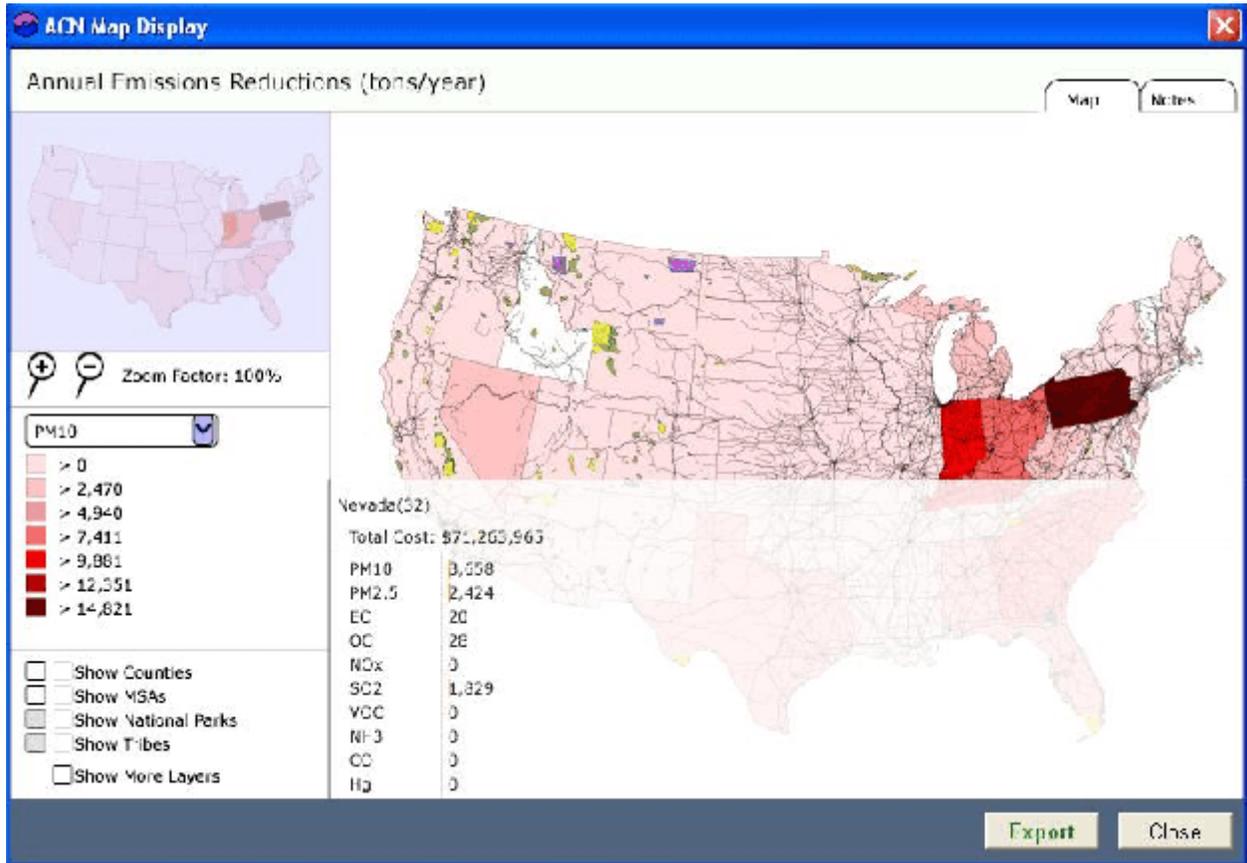
Data Range Type

- Equal Intervals
- Jenks Natural Breaks
- User Defined

	State	County	MSA
	<no data>	<no data>	<no data>
	0	0	0
<input checked="" type="checkbox"/>	16277	5712	6514
<input checked="" type="checkbox"/>	32554	11425	13028
<input checked="" type="checkbox"/>	48831	17137	19542
<input checked="" type="checkbox"/>	65108	22850	26056
<input checked="" type="checkbox"/>	81386	28562	32570
<input checked="" type="checkbox"/>	97663	34275	39084
<input type="checkbox"/>			

View Map **Save Map** **Close**

Figure VI-3. Map Display Window



2. Creating a Map

This section provides step-by-step instruction on how to create map using this tool. An example is provided throughout these instructions to assist you with this application in tutorial fashion. Example considered for the tutorial is to create map for NO_x reduction obtained from the controls on petroleum refineries in Texas selected from Control Scenario Module (CSM) .

Step 1: Apply Filtering Criteria to define the Query of Control Measures Database

You begin process of creating map by selecting Control strategy scenario from CSM . Select following filtering criteria for the data query in CSM.

Pollutant: NO_x

State: Texas

SCC: 30600000 (Petroleum Refinery Point Sources)

Step 2: Select Run Query Command to Initiate Query of Control Measures Database

Initiate the query by selecting the Run Query command. The matching control measures will then be displayed within the Database Grid area. You can select all the controls in the grid by selecting “Select All” command or refine them in the grid as required.

Step 3: Select Map under Analyze tab to display the geographical map

After selecting controls, select Map under the Analyze tab on the main menu to plot the reduction on the geographical map. You will be presented with the Map creation window. The map will have the default title - “Annual Emissions Reductions (tons/year)”. This can be edited as needed.

Additional static layers can be added to the map by selecting the check boxes next to the thematic layers shown in the top right of Figure VI-2. Colors can be customized by clicking the Color Squares next to each layer. Data ranges can be customized for each pollutant by selecting pollutant from drop down box and assigning data ranges for dynamic map feature, a state, county or MSA. Select additional ranges using the empty check boxes.

You have following three options for data range type:

1. Equal Interval - Automatic shading range option for dividing data ranges into equal intervals
2. Jenks Natural Break - Automatic shading range option for dividing data ranges using Jenks Natural Break algorithm
3. User Defined - Manual shading range option

Select any one data range type as required.

Step 4: View and Save Map

Maps can be saved by selecting the “Save Map” command from Map creation window. Maps are saved in Scalable Vector Graphics (SVG) format. Saved maps can be viewed independently outside the application. Selecting the “View Map” command to generate and views the map in a new AirControlNET window.

The top section in the control panel of the Map view window shows a navigation map and facilitates navigation. You can zoom in and out of the map by selecting “Zoom In” or “Zoom Out” marked with a plus and minus on magnifying glass. You can see the current level of zooming in percentage from Zoom Factor. You pan the map by moving the light blue square box around the map.

You can select the pollutant of interest, which is NO_x for our example, from the drop down list in the control panel. The data range legend for the selected pollutant will be shown. The mouse over on the map display panel pops up window showing total reduction for selected level (i.e. State, County or MSA) and total cost of reduction. You select “Show Counties” to view the county boundaries dynamic layer on the map. By selecting “Show Counties”, the county level reduction appears on the map. The Data range legend also changes correspondingly to show county level data range legend. Similarly by selecting “Show MSA”, you will be presented with MSA dynamic layer, MSA level reduction and corresponding data range legend. You can show additional static layers by checking the box “Show More Layers”. You can also add or remove any additional thematic layers from the map window as necessary. You should note that only the layers selected from the Map creation window would be active in the Map display window.

Step 5: Export Map

You can export the map by selecting “Export” command from the map screen. Map would be saved in the JPEG image format. You select the location to save the image when prompted.

B. GRAPH ANALYSIS TOOL

When a Least Cost Module query returns results, the graph analysis menu shown in Figure VI-4 becomes available. There are two graphs that can be displayed: “cost per Ton vs Incremental Tons Reduced” and “Cost vs Incremental Tons Reduced”. An Example of each graph type is shown in Figures VI-5 and VI-6, respectively. The graph display window provides the graph and its description. To edit the graph properties, click the “Properties” button. The map can be saved in JPG format using the “Export” button.

Figure VI-4. Selection Of Graphing Tool under Analysis Tab

AirControlNET v1.0 - Least Cost Module - 2010_20041214, Cost Year: 1997

File Edit Tools **Analysis** Data Help

POLLUTANT **Map** **Graph** **\$/Ton vs. Inc. Red. Cum. Inc. Cost vs. Tons Reduced**

REDUCTION TARGET **% REDUCTION TARGET**

PM10

MSA **STATE** **COUNTY**

10100 - Aberdeen, MD Micropolitan Stati
 10140 - Aberdeen, WA Micropolitan Stat
 10130 - Abilene, TX Metropolitan Stati
 10220 - Ada, OK Micropolitan Stati

01 - Alabama
 04 - Arizona
 05 - Arkansas
 06 - California

NAICS **SECTOR**

111 - Crop Production
 112 - Animal Production
 113 - Forestry and Logging
 115 - Support Activities for Agriculture and Forestry

Utility - Coal
 Utility - Natural Gas/Oil
 Utility - Oil
 Utility - Wind/Biomass

Run Query **Export File** **Export Script** **Reset Criteria** **Hide Criteria**

Number	State	County	Measure	Source	\$/Ton	Inc. Reduct	Cum. Inc. Red	Cum. Inc. Cost	MSA	Eff
1	38	C65	increase Monitoring Freq	Electric Generation - Coal	111	19.6	15.5	2,171		
2	38	C65	increase Monitoring Freq	Electric Generation - Coal	111	8.1	27.7	3,074		
3	38	C57	increase Monitoring Freq	Electric Generation - Coal	111	9.3	37.0	4,110		
4	26	147	CFM Upgrade and Fuel P	Electric Generation - Coal	123	1.0	38.0	4,256	15821	
5	19	C61	increase Monitoring Freq	Electric Generation - Coal	124	1.6	39.6	4,432	30220	

Total Controllable Tons **Tons Reduced** **Total Annual Cost** **Average Annual Cost / Ton**

Figure VI-5. Graph of Cost per Ton vs Incremental Tons Reduced

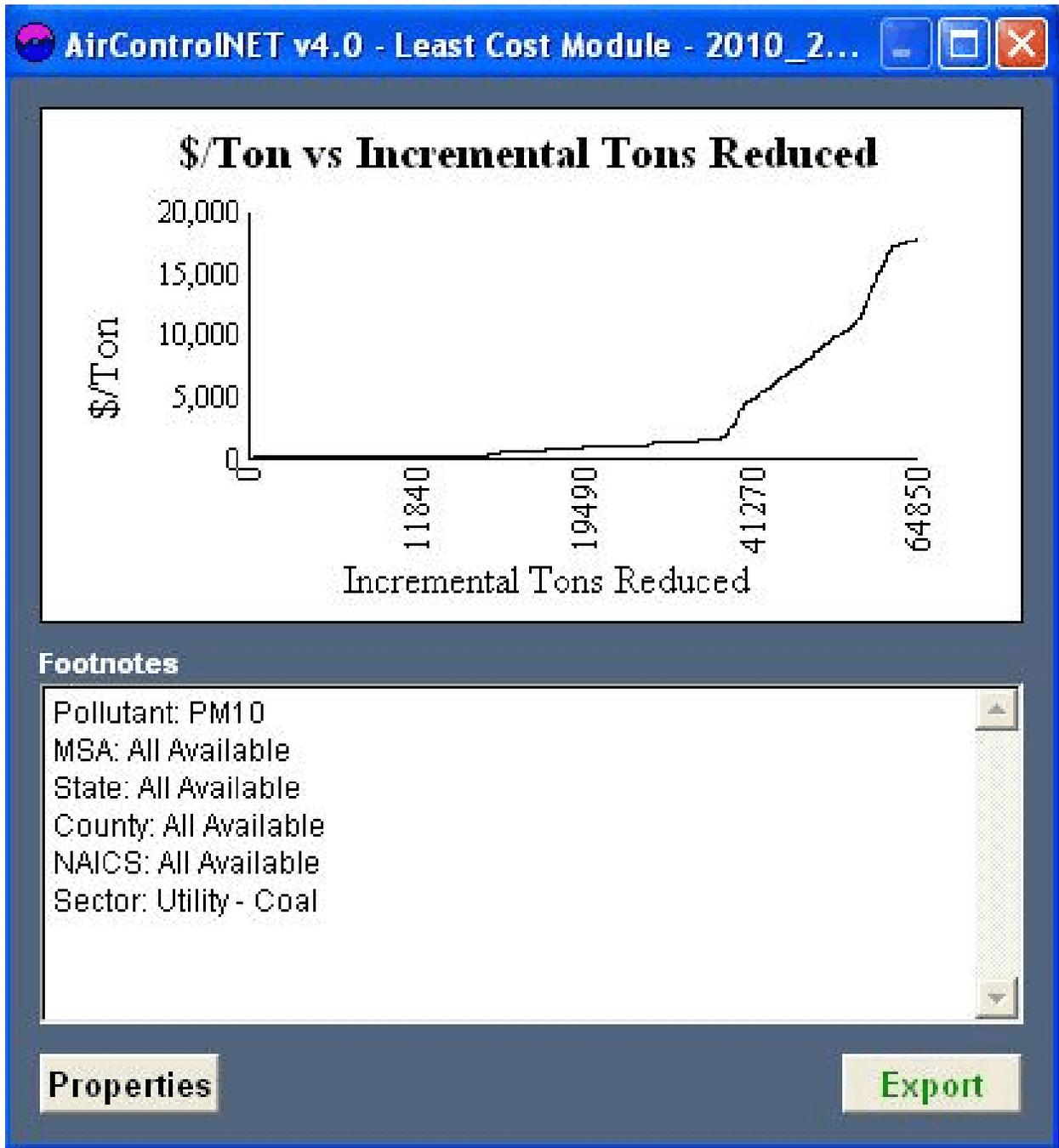
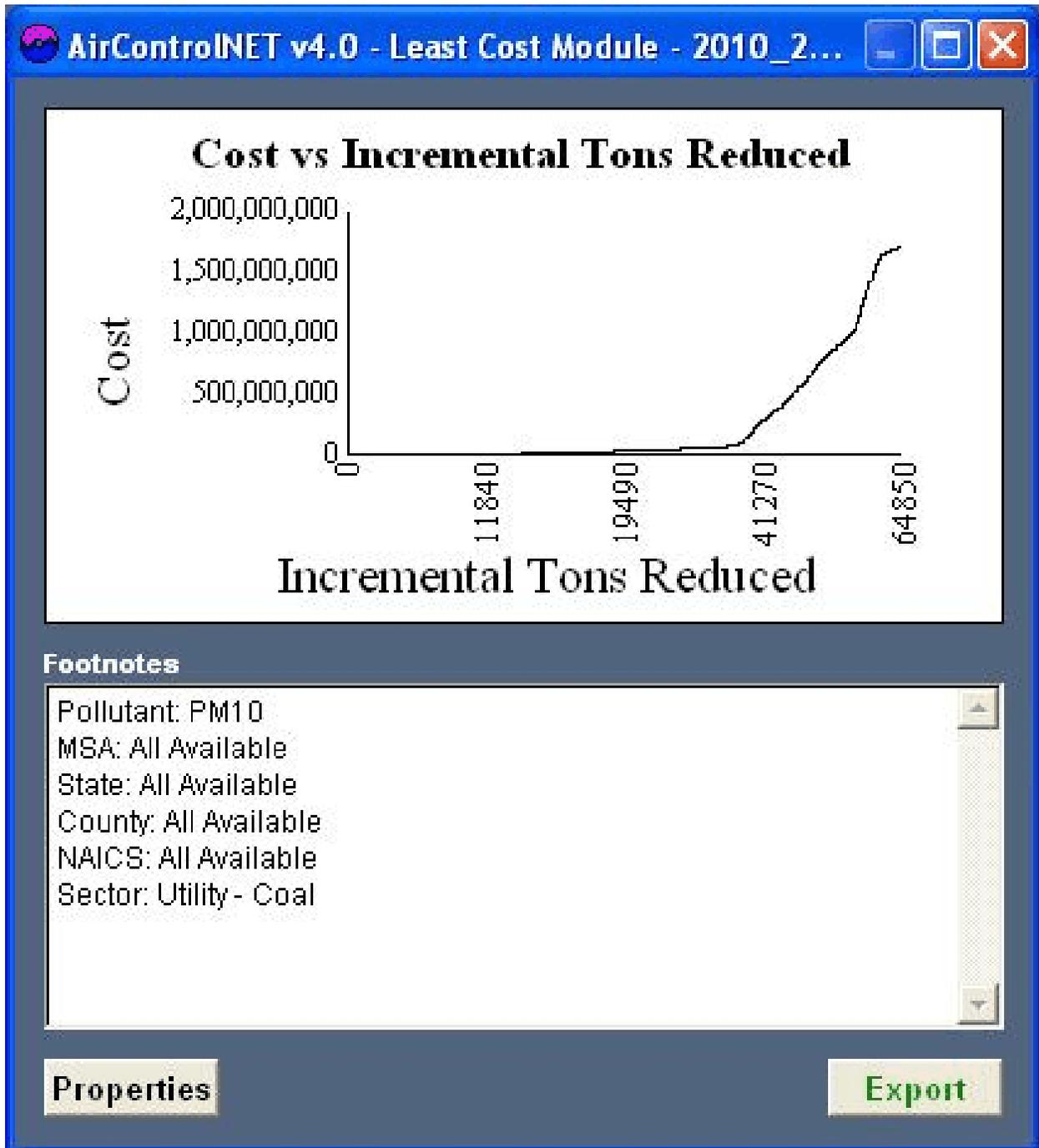


Figure VI-6. Graph of Cost vs Incremental Tons Reduced.



1. Overview of Graphing Tool

Graph of \$ / ton vs. Cumulative Incremental Reduction

This option plots \$ / ton of the selected pollutant versus the cumulative incremental reduction (in tons) on a line graph.

The LCM module within AirControlNET selects the sets of optimum controls to achieve the reductions based on the selections supplied by the user. The graph of \$/ton vs. cumulative incremental reduction is created using the output of the LCM module. In this graph, \$ / ton for each control is plotted against cumulative incremental reduction from the controls. This type of graph is useful for control implementation cost analysis since this graph can be used to evaluate the most cost effective controls and also observe sudden change in the slope of the graph, i.e., the sudden increase in cost effectiveness of control measures.

Graph of Cumulative Control Costs vs. Cumulative Incremental reduction

This option plots the cumulative total annual control cost of the selected pollutant versus the cumulative incremental reduction (in tons) on a line graph.

As in the previous graph, the AirControlNET LCM module is used to select the set of optimum controls to achieve the reductions as defined by the user. The graph of cumulative total annual cost vs. cumulative incremental reduction is created using the output of LCM module. This type of graph would be used to view the total control cost needed to achieve the specified emissions reduction.

2. Example of Graph Analysis Tool

This section provides a step by step example of the Graph Analysis Tool. The example below creates a graph of \$ / ton versus cumulative incremental for a 10% PM₁₀ reduction from utility sector controls.

Step 1: Apply Filtering Criteria to define the Query of Least Cost Module

Select following query criteria from LCM module.

Pollutant: PM₁₀

Sector: Utility

State: All

% Reduction Target: 10%

Step 2: Select Run Query Command to Initiate Query of Least Cost Module

Initiate the query of Least Cost Module by selecting the Run Query command. The least-cost set of control measure that achieves your emission reduction target will then be displayed within the database grid.

Step 3: Select Graph under Analysis tab on the main menu to plot graph

Select graph under Analysis on the main menu. You have the option of plotting following two graphs:

- \$ / ton versus incremental reduction
- Cost versus incremental reduction

Select \$ / ton versus incremental reduction for our example. You will be presented with graph display window. The Graph display window has two panels. The top panel provides the graph and bottom panel shows footnotes. The footnotes provide the following information about the graph:

1. Plotted pollutant
2. MSA
3. State
4. Counties
5. NAICS
6. Sector

Step 4: Customize the Graph properties

You can change the graph properties by selecting Properties at the bottom of graph window.

You can customize following graph properties:

1. **Title**—You can edit Graph Title, Bottom (X-Axis) title, Left (Primary Y-Axis) title, Right (Minor Y-Axis) title.
2. **Axis**—You can customize the color, position, scale, tick marks and grid for X-axis and primary Y-Axis.
- 3.
4. **Fonts**—You can customize fonts for Graph title, Axis label and Legend.
5. **Background**—You can change background color of the graph, apply different styles to titles.
6. **Labels**—You can change, turn it on or off labels for each of the axis and data.

Step 5: Export the Graph

You can export the graph by selecting “Export” command from the graph screen. Graph would be saved in JPG format. You can select the location to save the image.

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APPENDIX A: DATABASE GRID VARIABLES FOR CONTROL SCENARIOS MODULE

Column Name	Column Description
(Selected)	If the selected box is checked, the record should be included when summing, saving, or exporting.
Control	Control Measure Name
Source	Source Category
PM ₁₀	Annual Particulate Matter # 10 μ m Emission Reduction (Tons)
PM _{2.5}	Annual Particulate Matter # 2.5 μ m Emission Reduction (Tons)
EC	Annual Elemental Carbon Emission Reduction (Tons)
OC	Annual Organic Carbon Emission Reduction (Tons)
NO _x	Annual Nitrogen Oxides Emission Reduction (Tons)
SO ₂	Annual Sulfur Dioxide Emission Reduction (Tons)
VOC	Annual Volatile Organic Carbons Emission Reduction (Tons)
NH ₃	Annual Ammonia Emission Reduction (Tons)
CO	Annual Carbon Monoxide Emission Reduction (Tons)
Hg	Annual Mercury Emission Reduction (Tons)
Total Cost	Total Cost of the Control Measure
OM Cost	Operating and Maintenance Cost
Cap Cost	Capital Cost
\$/Ton	Cost Effectiveness (\$/Ton)
MSA	Metropolitan Statistical Area
St	State
Cnty	County
SIC	Standard Industrial Classification Code
NAICS	North American Industry Classification System Code
Sector	Sector (Utility, Non-Utility, Area, etc.)
SCC	Source Classification Code
Plant ID	Plant ID Code
Plant	Plant Name
Point ID	Point ID Code
Capacity	Boiler Capacity
Cap Units	Capacity Units
Operating Labor Costs	Operating Labor Costs (\$)
Maintenance Costs	Maintenance Costs (\$)
Supervisor Costs	Supervisor Costs (\$)
Maintenance Material Costs	Maintenance Material Costs (\$)
Replacement Costs	Replacement Costs (\$)
Electricity Costs	Electricity Costs (\$)
Steam Costs	Steam Costs (\$)
Fuel Costs	Fuel Costs (\$)
Waste Disposal Costs	Waste Disposal Costs (\$)
Chemical Costs	Chemical Costs (\$)
Other Raw Material Costs	Other Raw Material Costs (\$)
Other Utility Costs	Other Utility Costs (\$)
Total Direct Annual Costs	Total Direct Annual Costs (\$)
Overhead Costs	Overhead Costs (\$)
Administrative Costs	Administrative Costs (\$)
Property Tax Costs	Property Tax Costs (\$)
Insurance Costs	Insurance Costs (\$)

Total Indirect Annual Costs	Total Indirect Annual Costs (\$)
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APPENDIX B: DATABASE GRID VARIABLES FOR LEAST-COST MODULE

Column Name	Column Description
Number	The current record's rank. All records are sorted by incremental cost per ton.
State	State
County	County
Measure	Control Measure Name
Source	Source Category
\$/Ton	Cost Effectiveness (\$/Ton)
Inc. Reduction	Incremental Reduction (Tons)
Cum. Inc. Reduction	Cumulative Incremental Reduction (Tons)
Cum. Inc. Cost	Cumulative Incremental Cost (\$)
MSA	Metropolitan Statistical Area
SIC	Standard Industrial Classification Code
NAICS	North American Industry Classification System Code
Plant ID	Plant ID Code
Point ID	Point ID Code
Plant Name	Plant Name
SCC	Source Classification Code

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APPENDIX C: DATABASE GRID VARIABLES FOR SCRIPT BUILDER MODULE

Column Name	Column Description
(Selected)	If the selected box is checked, the record should be included when saving or exporting.
Region	Region Designation
MSA	Metropolitan Statistical Area
St	State
Cnty	County
Sector	Sector (Utility, Non-Utility, Area, etc.)
SCC	Source Classification Code
SIC	Standard Industrial Classification Code
Facility ID	Plant ID Code
NO _x	Nitrogen Oxides Control Factor
VOC	Volatile Organic Carbons Control Factor
CO	Carbon Monoxide Control Factor
SO _x	Sulfur Oxides Control Factor
NH ₃	Ammonia Control Factor
SOA	Secondary Organic Aerosols Control Factor
PM ₁₀	Particulate Matter # 10 μm Control Factor
PMC	Particulate Matter, Coarse Control Factor
PM _{2.5}	Particulate Matter # 2.5 μm Control Factor

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APPENDIX D: REPORTING FILES FOR CONTROL SCENARIOS MODULE

The Emission and Cost Summary Report Grids have the same columns. The only difference between the pages is the report generated (Emission or Cost).

Column Name	Column Description
No. Recs	Number of records that have the specified Measure and Source
Measure	Measure Name
Source	Source Category
Before Reduction	Total Emissions Before Applying Control Measure (Tons)
Reduction	Emissions Reduced (Tons)
After Reduction	Post Control Emissions(Tons)
% Reduction	Percent Reduction (Tons Reduced/Total Emissions*100)
Total Cost	Total Annual Cost of the Control Measure (\$)
Cost / Ton	Cost Effectiveness (\$/Ton)
Cum. Annual Emissions	Cumulative Annual Emissions (Tons)
Cum. Reductions	Cumulative Reductions (Tons)
Cum. Final Emissions	Cumulative Post Control Emissions (Tons)
Cum. Total Cost	Cumulative Total Cost (\$)
Cum. Cost / Ton	Cumulative Cost Effectiveness (\$/Ton)

Figure D-1. Example Cost Summary Report

Report Designer - rpt_cost.frx - Page 1 - AirControlNET v3.2 - Cost Summary - Emission Year: 1999, Cost Year...

File Edit Tools Data Help

PM10 Control Costs

Data is sorted by cost per ton

No. Acc.	Measure	Source	Tot. Cost	Cost/Ton	Contribution	
					Cost	% of Total
2	Fabric/Nonwoven	Forged Metal Products - Welding	4100	130	4100	1.0
2854	Soil Conservation	Agricultural Tilling	7360900	168	7360900	1.58
2954	Watering	Feed Cattle Feedlots	1101000	170	1100000	2.8
3059	Wagon Sweeping	Feed Padd	79010954	574	95185170	4.8
9220	Turf Asphalt Paving	Unpaved Rd	1200009107	602	1027927007	6.4
2959	Edible Oil Seed	Residential Wood Combustion	29058108	100	130288270	8.8
954	Incense Fuel Moisture	Residential Burning	98960754	318	145714450	6.9
3070	Chemical Sanitization	Unpaved Road	110000000	300	102700000	10.0
6070	Turf Control Plan	Construction Activities	934881785	457	918787000	10.1
300	Dale Stack/Propane	Agricultural Burning	30000000	600	91800000	10.0
401	Fabric Filter (Pulse Jet)	Grain Milling	11000000	800	92100000	10.0
28	Fabric Filter	Utility Boilers - Coal	6176000	100	92100000	10.0
401	Fabric/Nonwoven	Grain Milling	10000000	100	92100000	10.0
401	Fabric Filter	Grain Milling	10000000	100	92100000	10.0
51	Fabric/Nonwoven	Forged Metal Products - Abrasive	1000000	100	92100000	10.0
402	Fabric Filter (Mech)	Non-Ferrous Metal Processing	40100000	100	92100000	10.0
973	Fabric Filter (Pulse Jet)	Mineral Products - Stone Quarrying and	57968748	100	92100000	10.0
912	Fabric Filter (Pulse Jet)	Mineral Products - Coal Cleaning	91000000	100	92100000	10.0
402	Fabric Filter	Non-Ferrous Metal Processing	53282288	100	92100000	10.0
973	Fabric Filter (Mech)	Mineral Products - Stone Quarrying and	67000000	100	92100000	10.0
900	Fabric/Nonwoven	Mineral Products - Stone Quarrying and	90000000	100	92100000	10.0
874	Tray Filter/Wire Plate	Mineral Products - Stone Quarrying and	88000000	100	92100000	10.0
300	Dry ESP/Wire Plate	Non-Ferrous Metal Processing	90000000	100	92100000	10.0
910	Fabric Filter (Mech)	Mineral Products - Coal Cleaning	91000000	100	92100000	10.0

Figure D-2. Example Emissions Summary Report

Report Designer - rpt_emission.frx - AirControlNET v3.2 - Emission Summary - Emission Year: 1999, Cost Year...

File Edit Tools Data Help

PM10 Control Emissions

Data is sorted by cost per ton

No. Acc.	Measure	Source	Before Control	Incremental Reduction	After Control	Percent Reduction
2	Fabric/Nonwoven	Forged Metal Products - Welding	0	0	0	0
2854	Soil Conservation	Agricultural Tilling	4207076	430182	3867894	10
2954	Watering	Feed Cattle Feedlots	380100	290091	290091	24
3070	Wagon Sweeping	Feed Padd	7795753	138098	138098	51
9220	Turf Asphalt Paving	Unpaved Rd	2000000	1000000	941000	2
2959	Edible Oil Seed	Residential Wood Combustion	37357	186768	186768	9
954	Incense Fuel Moisture	Residential Burning	518139	300070	300070	30
3070	Chemical Sanitization	Unpaved Road	858724	350002	688722	2
6070	Turf Control Plan	Construction Activities	1765140	1200000	735177	5
300	Dale Stack/Propane	Agricultural Burning	100000	60000	40000	2
401	Fabric Filter (Pulse Jet)	Grain Milling	12000	100	100	2
28	Fabric Filter	Utility Boilers - Coal	16700	800	1000	2
401	Fabric/Nonwoven	Grain Milling	10000	100	100	2
401	Fabric Filter	Grain Milling	10000	100	100	2
51	Fabric/Nonwoven	Forged Metal Products - Abrasive	100	100	100	2
402	Fabric Filter (Mech)	Non-Ferrous Metal Processing	20000	20000	100	2
973	Fabric Filter (Pulse Jet)	Mineral Products - Stone Quarrying and	30000	30000	100	2
912	Fabric Filter (Pulse Jet)	Mineral Products - Coal Cleaning	40000	40000	100	2
402	Fabric Filter	Non-Ferrous Metal Processing	20000	20000	100	2
973	Fabric Filter (Mech)	Mineral Products - Stone Quarrying and	30000	30000	100	2
900	Fabric/Nonwoven	Mineral Products - Stone Quarrying and	30000	30000	100	2
874	Tray Filter/Wire Plate	Mineral Products - Stone Quarrying and	30000	30000	100	2
300	Dry ESP/Wire Plate	Non-Ferrous Metal Processing	20000	20000	100	2
910	Fabric Filter (Mech)	Mineral Products - Coal Cleaning	90000	90000	100	2